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ABSTRACT

Described is a generalized model for the evaluation of instructional materials and media designed to be usable by the Instructional Materials Centers/Regional Media Centers/Regional Resource Centers Network. The model is described as a guide to the inclusion of the critical elements in an evaluation problem situation. Discussed are a system for the identification and classification of instructional materials and media, instructional materials identification, a specific procedure for classification of information on instructional materials and media, measurement of teacher responses to and evaluations of instructional materials, and sequential analysis as a teacher judgment summarization technique. Also explored are procedures for the identification of exemplary materials criteria, and the appraisal of instructional materials and media by experts. Other topics considered are the optimizing of cooperative teacher behaviors in the field test setting, methodologies for the evaluation of instructional materials and media, and sequential analysis as a means of evaluating pupil performance. The author describes general procedures for selecting instructional materials as well as procedures for the selection of materials at various stages of the evaluative process. Appendixes contain a bibliography and a set of forms for evaluating instructional materials and media. (GW)

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A SOURCEBOOK FOR THE EVALUATION[1] OF INSTRUCTIONAL MATERIALS AND MEDIA

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August, 1973

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PREFACE

Within an area as complex as education evaluation, and with the vast amount of literature already extant in the area, one hesitates to contribute yet another document to this vast resource. Even so, it seems that a critical analysis of the existing literature and a shaping of the critical dimensions of evaluation into a more complete conceptualization and working model is a valuable undertaking. A more comprehensive and generalized conceptualization which draws on the extant work in the area would seem to lead to both a better understanding of the evaluation phenomenon, better communication among evaluators and the consumers of evaluative information and more effective implementation of and derivation of plans for the evaluation of instructional materials and media.

Certainly, the complexity of designing and documenting such a system is not viewed with simplicity. The dilemma of designing and documenting such a system has been well documented, and a glimpse at these complexities is paraphrased below:

> "There are many different opinions regarding what questions should be asked of (instructional materials) the relative importance of questions, the sources of the answers to the questions, the methods by which answers can be obtained, how the answers will be processed and how the information can be used. It would be desirable to have a grand synthesis of all of these ideas in a single system of collection, processing and use of information upon which all individuals and groups who have worked on the problems could agree. But it would not be desirable to force such a synthesis prematurely. The steps toward synthesis must include continued dialogue among all who have an interest in designing, criticizing, and using the information system. They must also include the collection and comparison of experience in using the different ideas, approaches, and methods" (Stevens, Jr. and Morrissett, 1967, pp. 10-11).

Despite the complexities involved in a comprehensive conceptualization and modeling of the evaluation problem and the real possibility that any conceptualization no matter how comprehensive and complete at one point in time may be outdated at another point in time, the potential payoff of such a comprehensive conceptualization and modeling in facilitating the provision of badly needed evaluative information for educational decision-making, obligates its provision. Through the process of use the conceptualization and its model will undoubtedly need to be modified or changed. It is only through this process, however, that a body of knowledge about processes such as evaluation can grow and become more refined. This whole modification process is at the very heart of evaluation itself. The present conceptualization and documentation of a system for the evaluation of instructional materials and media and its accompanying methodologies is seen as a first step in the process of synthesizing ideas, language, opinions and methodologies. The attempt here is to document a system for the evaluation of instructional materials and media

which is comprehensive, credible in terms of the existing knowledge in the field and usable by all of the members of the IMC/RMC/RRC Network such that the first step in the synthesis might begin. Ultimately, through use, the system might reach the ideal.

JRA
8/73

A GENERALIZED MODEL FOR THE EVALUATION OF INSTRUCTIONAL MATERIALS AND MEDIA

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The lack of evaluative information in educational evaluation has been attributed to three major factors: (1) the lack of trained evaluators, (2) a lack of appropriate evaluation instruments and procedures and (3) a lack of adequate evaluation theory (Stufflebeam, 1969). Although this comment on the "state of the art" in educational evaluation is over four years old, these same factors undoubtedly still contribute to the lack of well validated evaluative information readily available for consumer use. The EVALUATION SOURCEBOOK is a beginning attack on these three problems. The present paper seeks to examine extant conceptualizations of evaluation, point up and remedy logical and empirical weaknesses, and hopefully provide a framework which will facilitate clearer thinking, and, consequently more definitive action and results in the area of educational evaluation.

Evaluation Defined

Evaluation has been one of the most frequently talked about and written about phenomena in recent educational experience. This is evidenced by the large number of documents which have been published on educational evaluation during the past 10 years (see Bibliography, Appendix I). One of the major contributions of this body of literature has been the definitions and characterizations of evaluation and related terminology (e.g., systematic distinctions have been made between "research" and "evaluation" (Hemphill, 1969; Suchman, 1969).

Within this extant body of literature evaluation has been defined and characterized in many different ways. Evaluation has been described as "the discovery of the nature and worth of something" (Stake and Denny, 1969, p. 370). Evaluation has been characterized by "what it is supposed to do." For example, "evaluation attempts to answer certain types of questions about certain entities; the entities of concern are the various educational 'instruments' and the types of questions include questions of the form: How well does this 'instrument' perform? Does it perform better than some other instrument? What does this instrument do? Is this instrument worth what it's costing?" (Scriven, 1967, p. 40).

Evaluation has also been characterized by being both descriptive and judgmental. Evaluation is seen to both "describe something and to indicate its perceived merits and shortcomings" (Stake and Denny, 1969, p. 370).

Educational evaluation has also been defined as a process. In one instance, educational evaluation was defined as "the <u>process</u> of

obtaining and providing useful information for making educational decisions" (Guba and Stufflebeam, 1968). The elements within this process definition were distinctly defined as follows: (1) process - a particular and continuing activity subsuming many methods and involving a number of steps and/or operations, (2) obtaining - making available through such processes as collecting, organizing, analyzing, and reporting and through such formal means as statistics and measurement, (3) providing - fitting together into systems or subsystems that which best serves the needs or purposes of the evaluation, (4) useful - appropriate to predetermined criteria evolved through the interaction of the evaluator and the client, (5) information - descriptive or interpretive data about entities (tangible or intangible) and their relationships, (6) educational decisions - a choice among alternatives for action in response to educational needs or educational problems" (Guba and Stufflebeam, 1968, p. 24). In another instance, evaluation was defined as the "process of ascertaining the decisions to be made, selecting related information, and collecting and analyzing that information in order to report summary data useful to decision-makers in selecting among alternatives" (Alkin, 1969, pp. 3-4). In yet another instance, evaluation was defined as the process of examining certain objects and events in the light of specified value standards for the purpose of making adaptive decisions (Paulson, 1970).

The roles and goals of evaluation have also been used as definers (Scriven, 1967). The goals of evaluation are to determine the value or worth of an object. The identified roles of evaluation are: formative and summative. Formative evaluation refers to the gathering of data while a program is being developed for the purpose of guiding the development process. The role of formative evaluation has also referred to continuous data collection and feedback in instructional systems (Glaser, 1967; Lindvall and Cox, 1969). In these cases, evaluative information is used to adjust the curriculum to the needs of the pupil on a continuous and frequent basis (Brown, 1969). Summative evaluation refers to the assessment of the overall value of an educational program (Scriven, 1967).

Another way of categorizing evaluation is to distinguish between those that directly lead to administrative decisions (decision-oriented) about a particular program and those that contribute to a broad understanding (conclusion-oriented) of program and only indirectly lead to corrective decisions about a particular program (Cronbach and Suppes, 1969).

Critical Analysis of Evaluation Definitions

If one critically analyzes the various definitions of evaluation which have been provided, it soon becomes apparent that there are more similarities among the definitions than differences. Perhaps to start a very general definition of evaluation which incorporates all definitions provided should be abstracted. If this were done, evaluation could generally be defined as the process of collecting information for decision-making.

Provided only with this general definition, however, it would be very difficult to "evaluate." Immediately one has several questions about the task to be undertaken: What information? Information about what? How is this information to be collected? What decisions? Decisions about what? Whose decisions?

The earlier stated process definitions provide assistance in the conceptualization of the critical steps involved in the evaluative process. Some of the major steps in the process which can be readily abstracted from these definitions are: (1) the interaction with consumers to determine evaluative needs (i.e., questions to be answered, decisions to be made, and conclusions to be drawn); (2) the identification of methodology which provides for the collection of needed data, the organization, analysis and summarization of data; (3) the identification of evaluative information critical to the postulated evaluative problem of concern.

Consumer-Evaluator Interaction

The beginning point, then, for the establishment of an evaluative situation is with the consumer (see Figure 1). A consumer, here, is defined as any person who has a potential need or use for evaluative information or evaluation within an educational context. Some of the groups of individuals who might be considered to be potential consumers with needs for evaluative information are shown in Table 1. The concerns of the consumer to be considered here are those related to instructional materials and media.

The consumer-evaluator interactional process leads to the identification of an evaluation problem (see Figure 1). During this interactional interchange between consumer and evaluator, a dual process of sensitizing may occur. The consumer sensitizes the evaluator to his needs and the evaluator sensitizes the consumer to make him more aware of the potential uses of evaluation in educational situations. The consumer must be educated to think in terms of evaluation. The evaluator must be educated to think in terms of consumer needs. Through this process evaluation problems are defined.

Evaluation Problem Analysis

The evaluation problem which has been identified is then analyzed and specific elements within the evaluation problem are defined (Armstrong, 197[illegible]). The elements to be defined are: objects, objectives, standards, conditions and methods. Within this context, evaluation is defined as the process of ascertaining by a defined method the relative success of certain objects in meeting specified objectives under specified conditions in accordance with a prescribed set of standards.

Object(s) refer to what is being evaluated. An object is any educational product, material, program, media, method, system or any other thing which needs to be evaluated. The particular objects of focus within the present context are instructional materials and media. Instructional materials are defined as any devices, or things, which

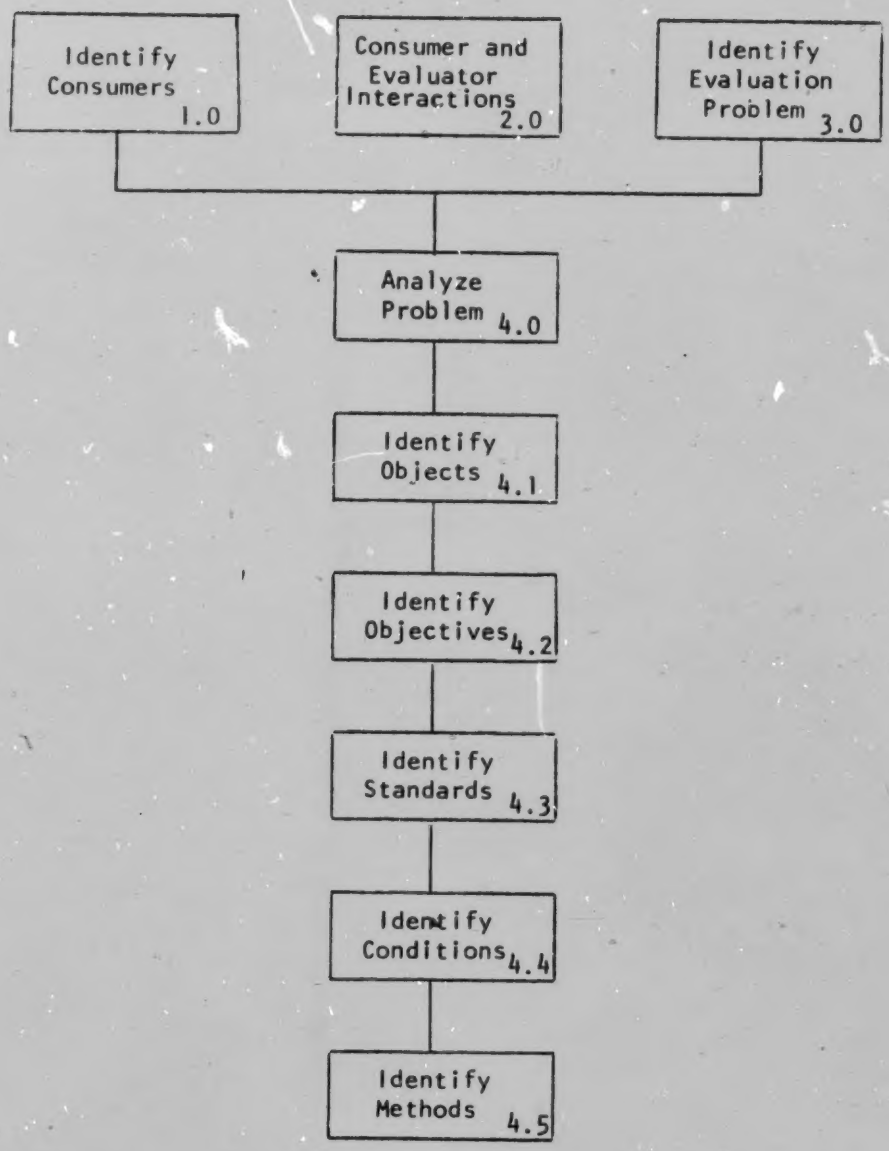

Figure 1. Define Evaluation Problem

TABLE 1

POTENTIAL CONSUMERS OF EVALUATIVE INFORMATION

Administrators	Curriculum Theorists
Teachers	Subject-Matter Specialists
Pupils	Disability Specialists
Parents	Evaluators
Community	Researchers
Producers	Developers

can be used in a defined manner to cause a targeted, educationally pertinent behavior to be exhibited by a particular individual. Media are defined as any intermediary activity and/or action which is explicitly definable and results in a targeted educationally pertinent behavior to be exhibited by a particular individual.

Objective(s) refer to the goals, purposes, intents, expectations, or aims for the object under consideration. The objectives within the evaluative situation link to the object(s). The objectives of instructional materials and media vary within materials and may be constant between materials. For example, given a set of cubical counting blocks, the objective might be to improve motor coordination or to teach numeral-quantity association (i.e., variable objectives within). In contrast, both cubical counting blocks and colored disks can be used to teach counting (i.e., constant objective between). The judgment of worth regarding either of these materials must be made in the context of the specified objective.

Standards are the criteria which must be met by the object relative to the stated objective(s). The standard is the criterion or level of acceptability (e.g., the level of product quality explicitly stated or defined). The standard varies as a function of the objective.

Conditions are defined as any factors which modify or restrict the nature, existence or occurrence of something else. Conditions refer to the restrictions or requirements that are put on the "evaluative situation" and ultimately the "evaluative" statement, conclusion or decision. For example, we might say the cubical counting blocks do an adequate job (90% of the pupils count correctly from 1-10) of teaching counting given the conditions that the pupils being taught are at the sensorimotor stage of development. Other conditions could be stated in addition (e.g., teacher style of interaction, instructional method, etc.).

The fifth major component in the evaluative situation is the method. The method is the approach or strategy to be used to determine whether or not the object has met the objective(s) in accordance with the prescribed standard(s) under the stipulated condition(s). Methods are primarily information gathering and reduction systems. Methods, for their formulation, draw from many major disciplines (e.g., mathematics, statistics, economics and engineering). In formulating evaluation methods, there is a need for application of the mathematics of problem solving and quantitative descriptions of qualitative entities and observed relationships. Determining a method also involves the process of abstraction, that is, identifying the critical components of the situation and utilizing numbers as a priority or value weighing scheme to form a single value composite for decision making.

To summarize, then, there are five major elements which can be identified within every evaluation problem. The elements are: (1) object(s), (2) objective(s), (3) standard(s), (4) condition(s) and (5) method(s). To define the (1) object(s), (2) objective(s), (3) standard(s), (4) condition(s) and (5) method(s) once the problem

area has been established, the following questions can be asked: (1) What is being evaluated? (object(s)); (2) What is the purpose of the activity under consideration? What is expected? What is desired? (objective(s)); (3) What is the level of acceptability for this object in terms of this objective? (standard(s)); (4) Are there any special requirements or restrictions which must be considered in considering this object relative to its objectives? (condition(s)); (5) How can the information needed to determine whether this object meets this objective under these specified conditions in accordance with the specified standard best be gathered and summarized? (method(s)) (see Figure 1).

Once these elements have been abstracted from the situation and defined, then the methods for collecting the needed information can be implemented. The results obtained can be utilized to answer the question posited: Does this object meet these objectives under these conditions in accordance with this standard as determined by this method? (see Figure 2). If the answer to this question is "no" then a negative decision can be made, the problem can be reformulated or the individual elements making up the problem formulation can be examined. Under this last option, there is a recycling of the process wherein the elements (e.g., "objectives, "conditions," "standards" and "methods") become the objects for a new evaluation problem (see Figure 3).

Particular Evaluation Problem Exemplar

At this point it may be helpful to describe a particular evaluation problem which might be identified. Assume for the moment that in this particular situation the consumer is a school administrator who wants to select a particular reading program for school adoption and purchase. To help the administrator with the problem, the evaluator should ask certain questions about the administrator's situation. First, "what are the objectives the school administrator has for this reading program?" After conversation, it may be suggested that the objective in this case is to provide pupils in the Special Education Program (i.e., EMR) with an "effective" and "cost-efficient" program for the teaching of reading.

After further conversation, the particular conditions under which this program would be expected to function could also be delineated. For example, the types of teachers within the school, the type of school environment, the preferred methods of instruction, a more complete description of the types of learners, and any special types of characteristics which the instructional material or program should have would all be considered important items for discussion.

An outline of the types of existing conditions which the administrator and evaluator might wish to consider in defining this (and other) evaluation problems is provided in Table 2. The major classes of conditions to be considered are: environment, teachers, learners, curriculum, instruction and media.

In each of these areas conditional elements should be specified for the particular problem under study. These become a part of the

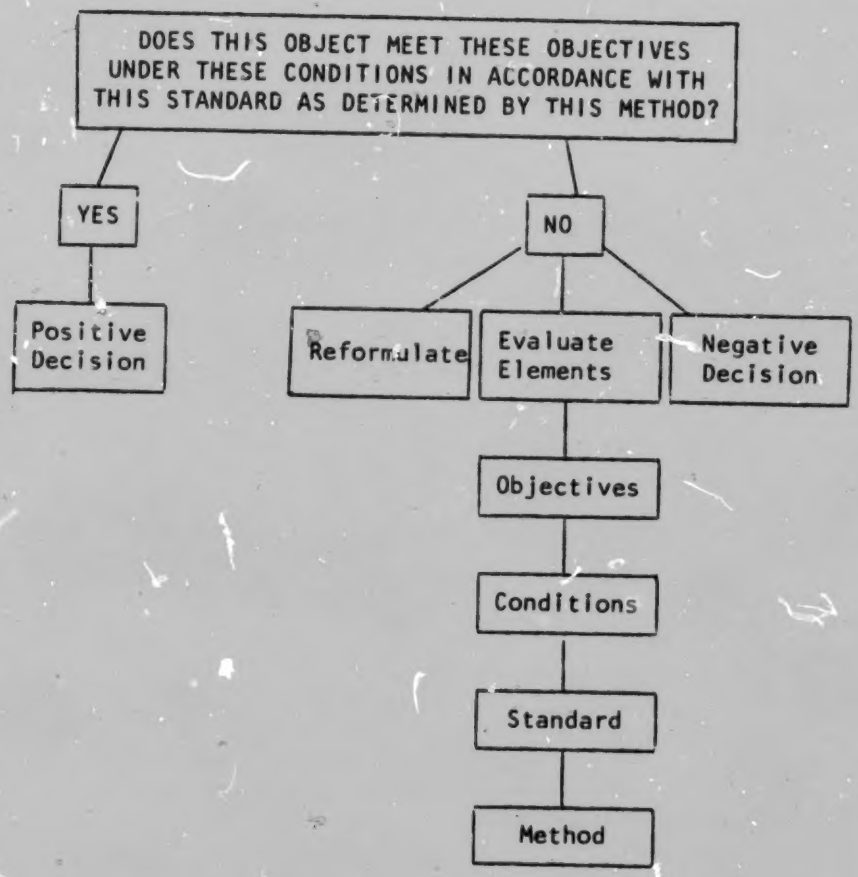

Figure 2. Evaluating: Making an Informed Decision.

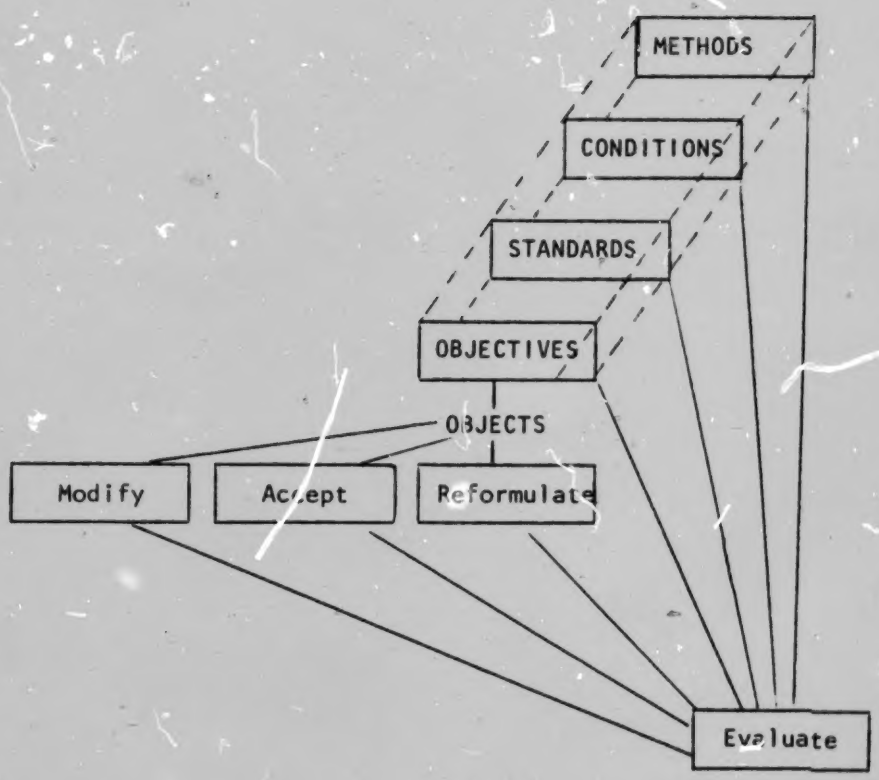

Figure 3. Recycling: Evaluation of the Evaluative Situation Components

TABLE 2

MAJOR CLASSES OF CONSUMER CONCERNS[1]

Classes	Subclasses	Variables
CONDITIONS OF USE ANTECEDENTS		
Media	Identifiers	--Author, title, library identification numbers, publication date,...
	Physical Characteristics	--Packaging, transportability, durability, storability,...
	Availability/Cost	--Location, cost of access, initial cost, per use cost source,...
Environment	Administrative Structures	--Restrictions (e.g., mainstreaming), bureaucratic degree of requirements, flexibility,...
Classroom School Institution Home Community	Physical Plant	--Space, lighting, temperature control, furnishings,...
	Socio-Cultural-Sexual Character	--Race, sex, cultural distributions; biases, controversies,...
	Socio-Emotional Climate	--Attitudes, interests, priorities, press,...
	Economic	--Financial support,...
	Auxiliary Resources	--Library, resource center, a-v equipment,...
Curriculum	Course of Study	--Scope (goals, objectives, content), sequence, placement,...
	Attitudes toward Course of Study	--Fixed, flexible,...
	Educational Philosophy	--Information dissemination, whole child,...

TABLE 2...continued

Classes	Subclasses	Variables
Learners	Learning Characteristics	--Learning style, patterns of behavior in learning situations,...
	Experiential Background	--Past learning, exposure, ...
	Aptitudes	--Academic, non-academic, ...
	Handicaps	--Information processing, physical (visual, auditory, motoric), emotional, ...
	Developmental Level	--Cognitive (e.g., Piagetian), affective, psychomotor,...
	Intelligence	--Global problem solving, creativity,...
	Attitudes, Interests, Preferences, Priorities	--Academic, non-academic, ...
Teachers	Background	--Training, experience,...
	Knowledge	--Aptitudes, skills, abilities,...
	Teaching Style	--Directive, non-directive, fixed, flexible,...
	Attitudes, Interests, Preferences, Priorities	--Academic, non-academic, ...
	Social-Emotional Character	--Personality, consistency,...
	Handicaps	--Information processing, physical, social, emotional,...
	Intelligence	--Global, creativity, problem solving,...
	Aptitudes	--Academic, non-academic, ...

TABLE 2...continued

Classes	Subclasses	Variables
TRANSACTIONS		
Instruction	Methods of Implementation	--Discovery, expository, behavior management, programmed instruction, project oriented,...
	Transactions	--Learner-learner; teacher-learner; teacher-learners,...
	Incentives	--Grades, reinforcers, motivational structures, ...
RESULTS OF USE		
Direct Outcomes		
Learner Changes	Cognitive	--Knowledge, skill, incidental learning,...
	Affective	--Attitudes, interests, commitments,...
	Psychomotor	--Manipulation, perception,...
Indirect Outcomes		
Feedback Effects on	Environment	--Administrative, physical, social-emotional changes in classroom, school, home, institution or community,...
	Teachers	--Changes in teaching style, attitudes, knowledge, application,...
	Instruction	--Changes in method, transactions, incentives,...
	Media	--Change in media type, media, or media aspect,...
	Curriculum	--Change in proscribed course of study, attitudes toward proscribed course of study,...

TABLE 2...continued

Classes	Subclasses	Variables
Standards	Absolute	--n% of the learners will perform at "1" level of k% of the time
	Relative	--performs better under this instructional material or media than under a comparative instructional media or material

[1] The major delineation and definition of the classes: curriculum, instruction, learners, teachers, environment, media (here inclusive of materials) can be found in Armstrong, J. R. An educational process model for use in research. Journal of Experimental Education, 1970, 39(1), 2-7.

conditions statement. Also, certain terms within the objectives statement must be more completely defined. For example, "effective" must be discussed with the administrator until specific outcome statements are derived.

The desired outcomes which occur as a result of using the instructional material or media can be conceptualized as being either direct or indirect. Direct outcomes are those effects on learner behavior which occur as a result of use of the instructional material or media. Indirect outcomes refer to effects of the instructional materials or media on the input elements of the system (i.e., feedback which causes change in the input elements). When interacting with the consumer, the evaluator must determine which direct and indirect outcomes the consumer wants as a result of utilizing the instructional materials or media.

Direct outcomes may be cognitive, affective or psychomotor behavioral changes in the learner or desired behavioral changes in all three areas. The consumer in communication with the evaluator can pinpoint these as objectives. Indirect outcomes can be more specifically detailed as those results of use of the instructional material or media which cause changes in such existing conditions as environment, media, instruction, learners, teachers and curriculum. For example, if a teacher uses a teaching strategy (i.e., problem solving method of instruction) and feels it is not successful, an indirect outcome effect on the teacher could be negative feelings about the methodology which results in the change of the methodology. These kinds of outcomes can in some cases be predicted in advance. In these cases, consumer concerns relative to indirect outcomes become important and can be specified during the interaction between consumer and evaluator. Similarly, "cost-effective" must be defined further as well. After much probing and discussion, the objectives statement along with a statement of level of acceptability (standards) might be formulated as follows: To provide a reading program for the EMR classes which will result in 90% of the pupils reading at 4th grade norms as assessed by the Stanford Reading Subtest after five years in the program.

This particular standard is an absolute standard. The expectation for the instructional material or media is that it will result in performance at a particular criterion level. Absolute standards are stated in the form: n% of the learners will perform at the "l" level k% of the time.

Standards can also be relative. Relative standards are comparisons with other instructional materials and media. The standards for the evaluation problem can be stated in either form: relative or absolute or both (see Table 2).

"Cost-efficient" must still be defined. After further deliberation, the cost per pupil under the objectives and standards stated below should be determined (e.g., $2.50 per pupil). A summarization of the formulation thus far is shown in Figure 4.

CONSUMER	School Administrator
OBJECT	
CONDITIONS	
Learners	200 EMR pupils, CA 8-10, MA 6-8
Teachers	Operant style teachers
Environment	Varied environments
Instruction	Prefer very tightly programmed instruction; options for small group and individualized instruction
Media	Durable, reusable, inexpensive, storable
Curriculum	None prescribed
OBJECTIVE	To provide a program which teaches reading
STANDARD	Cost per pupil of $2.50/yr. for five (5) years with the resultant outcome of 90% of the pupils involved in the program reading at the fourth (4th) grade level as assessed by the Stanford Reading Subtest

Figure 4. Evaluation Situation Formulation

As shown in Figure 4, all of the evaluation problem elements have been described except for the program or instructional material (i.e., object). To provide information relative to what program or material might be suggested, a more detailed discussion of instructional materials and media is needed. Therefore, the information needed to fully describe instructional materials and media for evaluation problem situations is provided.

The Nature of Instructional Materials and Media

Instructional materials and media are quite variable in nature. Although it is possible that some products would be ideally suited (or at least better than any competing product) for all conceivable uses (constant value of products), it is not probable (Stake, 1967a). Typically a particular educational product is recommended for use with only particular types of children, with certain teachers, for only certain times, and for only certain educational objectives (Stake, 1967a).

The inherent properties of instructional materials and media which define their use are the variables of concern to the evaluator and consumer. Each variable defines a type or class of information about an instructional material which must be collected in order to make the decisions called for in potential evaluation problem situations.

Information Classification Systems

As instructional materials and media have been examined, the multidimensional character of their variability has been acknowledged (Westbury, 1970; Stake, 1967a; Stevens, Jr., and Morrissett, 1967; Campbell, 1970; Armstrong, 1971). To better deal with the variety of information required, a modified information classification system for the collection, classification and organization of instructional materials and media information has been developed (see Figure 5). This system is based on the previously conceptualized classification system for consumer concerns (see Table 2) and the materials information classification system provided by Stake (1967a, 1967b) (see Figures 6 and 7).

The more specific information classification system (Stake, 1967a) was designed for the purpose of classifying the types of evaluative information about educational products which might be collected by the Educational Products Information Exchange (EPIE) (see Figure 6). Three major dimensions were considered to be important in the classification of information within this matrix: (1) the referent for the information (i.e., whether it refers to a "condition of use" or to a "result of use"); (2) the nature of the information: Does the information deal with "intents" (i.e., what is expected), "observations" (i.e., what is seen to occur in practice) or "judgments" (i.e., what is desirable); and (3) the source of the information: producers, analysts and users.

		Expected	Actual	Ideal
Conditions of Use	ANTECEDENTS			
	Media	IB[1] IC	IIA IIB	IIIA IIIB
	Environment	IC	IIB	IIIA
	Curriculum	IC	IIB	IIIA IIIB
	Learners	IC	IIB	IIIA
	Teachers	IC	IIB	IIIA
	TRANSACTIONS			
	Instruction	IC	IIB	IIIA IIIB
Results of Use	OUTCOMES			
	Direct	IC	IIC IVB IVC	IIIA
	Indirect		IVB	IIIA
	STANDARDS			
	Absolute		IIC IVB IVC	IIIA
	Relative		IVB	IIIA

Figure 5. Modified Information Classification Matrix

[1] I refers to internal sources of information; II refers to information derived from teachers; III refers to information derived from experts; and IV refers to information derived from learners. Letters refer to specific methodologies in the SOURCEBOOK.

Data Matrices	Rationale for Product Utility	Physical Description of Product	Standards for Such Products
	INTENTS	OBSERVATIONS	JUDGMENTS
	Information from Producer Analysis Users	Information from Producer Analysis Users	Information from Producer Analysis Users
Conditions of Product Use			
Results of Product Use			

Figure 6. Matrices to guide the collection of evaluation information about an educational product[1]

[1] Reprinted with permission from Stake, R. E. A research rationale for EPIE. EPIE Forum, 1967, 1(1), p. 9.

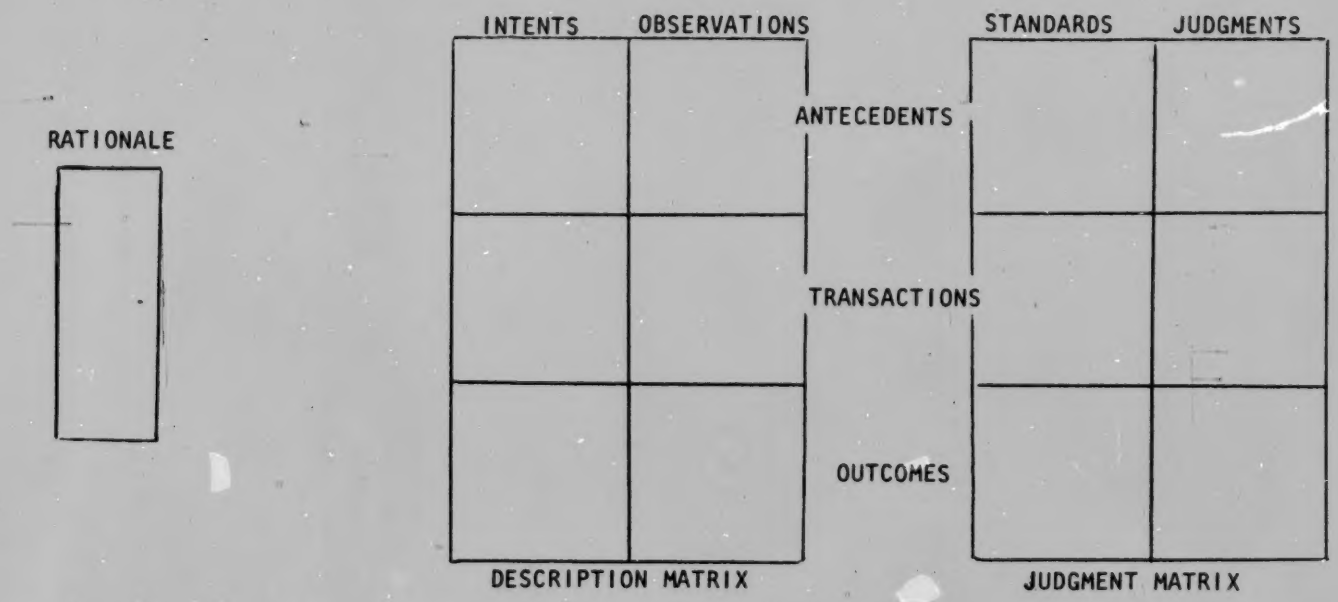

Figure 7. A layout of statements and data to be collected by the evaluator of an educational program.[1]

[1] Reprinted with permission from Stake, R. E. The countenance of educational evaluation. Teachers College Record, 1967, 68(7), p. 529.

Referent for the Information Dimension.

Within "results of use" and "conditions of use," three additional categories were identified: "antecedents," "transactions," and "outcomes" (see Figure 7) (Stake, 1967b). Within this classification scheme "antecedents" refers to the first two types of "conditions of use" subdivisions, "local circumstances" and "curricular context" (see Table 3) and "transactions" refers to the elements within the "classroom transactions" subdivision (see Table 3). An antecedent is any condition existing prior to teaching and learning which may relate to outcomes. Transactions are the countless encounters of students with teacher, student with student, author with reader, parent with counselor--the succession of engagements which comprise the process of education. Outcomes refers to the abilities, achievements, attitudes and aspirations of students resulting from an educational experience (Stake, 1967b).

When this same dimension was examined in another context, additional categories of information were added[1] (Stevens, Jr., and Morrissett, 1967). The major additions occur in the subclasses of information previously referred to in the media class of the Major Classes of Consumer Concerns (see Table 2). Items identified in the Media Class (see Table 2) were not accounted for in the Stake (1967a; 1967b) systems (see Table 3).

The additional elements added in the media class are the types of information needed for the unique identification of an educational product (see Media Identifiers, Table 2), the types of information which describe the physical characteristics of the instructional material or media (see Media, Physical Characteristics, Table 2) and information relative to the location of, accessibility of and cost of an educational product (see Media Availability and Cost, Table 2).

These classes of information are important to the consumer and evaluator and help to determine which instructional material or media should become the object for particular evaluation problems. For example, the relative availability, cost, and ease or difficulty of access is information which must be considered in making certain materials and media decisions (i.e., if the consumer can have one item in two hours and another item of similar merit and utility in 24 hours, a decision to opt for the former rather than the latter would be indicated).

---

[1] When one logically analyzes the elements contained within the categories which Stevens, Jr. and Morrissett (1967) posit, there are many inconsistencies of class; therefore, the author has selectively chosen those elements which were not accounted for in the Stake information models which are much more complete and adaptable for the present purpose. It should be noted that the analysis of curriculum done by Stevens, Jr. and Morrissett was done with other purposes in mind.

TABLE 3

SUBDIVISIONS OF INFORMATION CLASSES FOR EVALUATING EDUCATIONAL PRODUCTS[1]

Subdivision	Examples of Variables in the Subdivision
CONDITIONS OF USE	
Local Circumstances	
Student Types	(background, aptitude, aspiration,...)
Teacher Type	(experience, style, personality,...)
Type of School	(physical plant, intellectual climate,...)
Type of Community	(support of schools, attitudes, controversy,...)
Curricular Context	
Subject Matter Coverage	(concepts, structure, methods of inquiry,...)
Instructional Aids Available	(library, models, maps, equipment,...)
Concurrent Coursework	(sequence, time allotment, projects,...)
Classroom Transactions	
Teaching Strategies	(discourse, inquiry, assignments,...)
Student-Teacher Interaction	(information, flow, counseling,...)
Student-Student Interaction	(social climate, reaction to authority,...)
Incentives,grades,etc.	(motivation, goal orientation, testing,...)
RESULTS OF USE	
Gain in Student Competence	
Knowledge	(data, understanding, application,...)
Skill	(problem solving, communication,...)
Incidental Learning	(synthesis, learning sets, side effects,...)
Change in Student Attitude	
Interest	(opinion, avocation, exploration,...)
Commitments	(prejudice, aspiration, advocacy,...)
Effects of Staff	
Teacher Changes	(insights, revision, grievances,...)
Administrative Changes	(organizational rearrangements permitted,...)
Other Effects	
Institutional Effects	(prestige, solidarity,...)
Community Effects	(controversy, dedication, esprit,...)

[1]Reprinted with permission from Stake, R. E. A research rationale for EPIE. EPIE Forum, 1967, 1(1), p. 13.

Therefore, in the modified information classification system (see Figure 5), this dimension included all of the Stake elements (see Table 3) plus those elements posited by Stevens, Jr. and Morrissett (1967) as well as the additional elements previously posited in the Major Classes of Consumer Concerns (see Table 2). The major subclasses within transactions is instruction (see Table 2) and the major subclasses within outcomes are direct, cognitive, affective and psychomotor, and indirect (i.e., feedback effects on input components), media, environment, curriculum, learners, teachers and instruction (see Figure 5; Table 2).

Standards are also considered as a part of the results of use in this dimension of the matrix (see Figure 5). Standards, as previously defined as a part of Major Classes of Consumer Concerns (see Table 2), can be either absolute or relative. Stake's (1967b) use of standards is discussed in the next section.

Nature of the Information Dimension

The columnar classifications "intents," "observations" and "judgments" in the more specific information matrix of Stake's (1967a) (see Figure 6) were changed in the more general matrix to include an additional classification, "standards" (see Figure 7) (Stake, 1967b). "Intents" was defined as "all that may happen; it was considered to be synonymous with goals and objectives and inclusive of planned for events" (Stake, 1967b, p. 530). "Intents" has also been defined as expectations (Stake, 1967a). As described, defined and represented, "intents" has referred to two different entities in the Stake (1967a, 1967b) systems. Intents has referred to both "that which is expected" and "objectives."

Expectations (or expected) is used in the modified information classification system to refer to those things which are anticipated to be true or to occur (see Figure 5). Objectives refer to purposes, aims and goals. To be consistent and since objectives is handled elsewhere in the present conceptualization (i.e., expected direct outcomes, see Figure 5), "expected" is used instead of "intents" (see Figure 5).

"Observations" was not explicitly defined, but its implied use was "that information which derives from noting occurrences" (Stake, 1967b). Since observations is also linked to a methodology, the term "actual" was used in the modified information classification system (see Figure 5). In this way, how actual is determined is left to vary. "Actual" was defined as that which is existent as a thing, state or quality, that which is real.

"Standards" (see Figure 7) was defined as "a desired level or quality of something as cited by an authority" (Stake, 1970, p. 185), or, "benchmarks of performance having widespread reference value" and "the level of competence at which (a student) performs essential scholastic tasks" (Stake, 1967b, p. 535). Since this definition was somewhat limited, a more general definition seemed to be needed.

Thus, standards were defined as the criterion or level of acceptability (see Figure 5). This definition allows for the use of "standards" in a wider variety of evaluative contexts and situations (e.g., both absolute and relative situations).

"Judgments" (see Figure 7) was defined as "a decision as to how much to pay attention to the standards of each reference group (point of view) in deciding whether or not to take some administrative action" (Stake, 1967b, p. 536). Judgments deal with values which translate to priorities and objectives. Judgments information is important, but it would appear to be misplaced in this information classification schema (see Figure 7).

In the Stake (1967b) classification matrix, judgments were not dependent on or examined as a function of what was being judged or who was doing the judging (see Figure 7). This, however, is at the core of judgments. In the modified classification schema, judgments become a method for deriving information to put into the matrix. Judgmental information is examined in the context of both the source of the information (i.e., teachers, experts, learners) and the types of judgments being made.

An additional category was added to this particular dimension, however, to provide for that body of information which deals with what would be if all conditions were perfect. "Ideal" is used to refer to conditions of use and/or results of use which would exist for an instructional material or educational product if circumstances were perfect.

In summary, in this dimension of the information classification matrix, the terms "expected," "actual," and "ideal" are used (see Figure 5). "Expected" characterizes and classifies the information which Stake (1967a, 1967b) refers to as those things which are anticipated to be true or to occur. "Actual" refers to those things (i.e., conditions, outcomes, standards) which in reality do occur. "Ideal" refers to those things which one would like to have occur if all circumstances were perfect.

Sources of the Information Dimension

Instructional materials and media information can come from a variety of sources. Some of the major sources are: producers and developers, the material or educational product itself, teachers, pupils, parents, administrators and a wide variety of such "experts" as learning theorists, subject-matter specialists, curriculum developers and others. In the present classification scheme "internal" refers to information derived from the material itself and producers, authors, developers and publishers (Lumsdaine, 1965; Cunningham and Sanders, 1973). The "teachers" category refers to information obtained from teachers; the "experts" category refers to information obtained from learners. The major categories for the sources of information are: I. internal, II. teachers, III. experts, and IV. learners.

Human information sources will vary in their accuracy as a function of their knowledge and experience in the area of query. For example, information relative to the specific cost of an instructional material can be obtained with the greatest accuracy from the producer or developer of the material. In contrast, when the type of information needed is the usability of the instructional material in the classroom and, although producers and developers have certain expectations in this regard, the teacher is undoubtedly the best source of information in this case.

The problem, of course, is one of determining which source of information will provide the most accurate information relative to the type of information. The underlying relationship implies that the problem is one of determining that source which is the most knowledgable and experienced relative to the information being sought.

The information source becomes an important element in the collection of the information which feeds into the information matrix. The information source is defined by the method used to collect evaluative information.

Specific methods for collecting materials information have been defined within the context of the source from which the information derives: I. internal, II. teachers, III. experts, and IV. learners (see Figure 5). Certain sources (i.e., I-IV) have been identified as the most appropriate source for deriving specific classes of information (see Figure 5).

Different methods can be utilized to derive either the same or different information from the same source (i.e., letters refer to different methodologies for collecting information from the same source--e.g., IA, IB, IC, etc.) (see Figure 5).

The sources of information are referred to as "levels of evaluation." The various levels of evaluation are dealt with in separate sections of the SOURCEBOOK. All methodologies which deal with that level of information collection are grouped together.

Summary

A modified, information classification matrix for the classification of instructional materials and media information which is more complete and logically consistent has been provided (see Figure 5). Three major dimensions were included: (1) Referents for the information: conditions of use (antecedents and transactions), results of use (outcomes), and standards; (2) Nature of the information: expected, actual, or ideal; and (3) Source of the information: internal, teacher, experts, learners.

Major subclasses of information within antecedents are: media, environment, curriculum, learners and teachers. The major subclass of information within transactions is instruction. The major classes of information within Results of Use are Outcomes and Standards. Subcategories within outcomes are direct and indirect. Direct outcomes refers to those effects which are planned for and are the main intent

of introducing the program. Indirect outcomes refers to effects on the input elements of the system (i.e., curriculum, teachers, instruction, environment, and media) caused by the object (e.g., material) under test. For example, if a teacher uses a teaching strategy (i.e., problem solving method of instruction) and feels it is not successful as it is being used, an indirect outcome effect on the teacher may be her negative feelings about the methodology which results in the change of the methodology irrespective of the direct effect of the methodology on the learner. The direct outcomes are typically more definable than the indirect.

The subdivisions within the standards category are: absolute and relative. Absolute standards refer to criteria. Relative standards refer to comparisons.

Another major dimension of the matrix includes: expected, actual, and ideal. There are special elements contained within the cross-dimensions of this and other categories. For example, expected direct outcomes are what are usually referred to as behavioral objectives. Most well-designed programs have implicit objectives imbedded in their use. If you use a particular material in a specified way you can anticipate (or expect) a certain outcome.

The information within the matrix comes from different sources: internal, teachers, experts, and learners. The sources of the information define levels of information collection: Level I, internal; Level II, teachers; Level III, experts, and Level IV, learners.

Consumer Situational Information versus Materials Information

Thus far, two different types of information with identical classification schemata have been posited. First, there is information about the consumer's situation, and second, there is information about the instructional materials or media. Both types of information have the same classes and subclasses for their organization (see Table 2 and Figure 5). The major distinction is that the information contained within the matrix (see Figure 5) varies depending on whether one is referring to the consumer's situation or the instructional material.

Information Consistency

The consistency of the information within the information classification matrix is also a problem for consideration. Consistency is defined as the agreement, logical or empirical, between the classes of information within matrices or between matrices.

Consistency of information within matrices has been well defined (Stake, 1967b). Logical consistencies were defined as "contingencies" between "antecedents," "transactions" and "outcomes" (see Figure 8). Empirical consistencies were defined as "congruence" between "intents" and "observations" (see Figure 8).

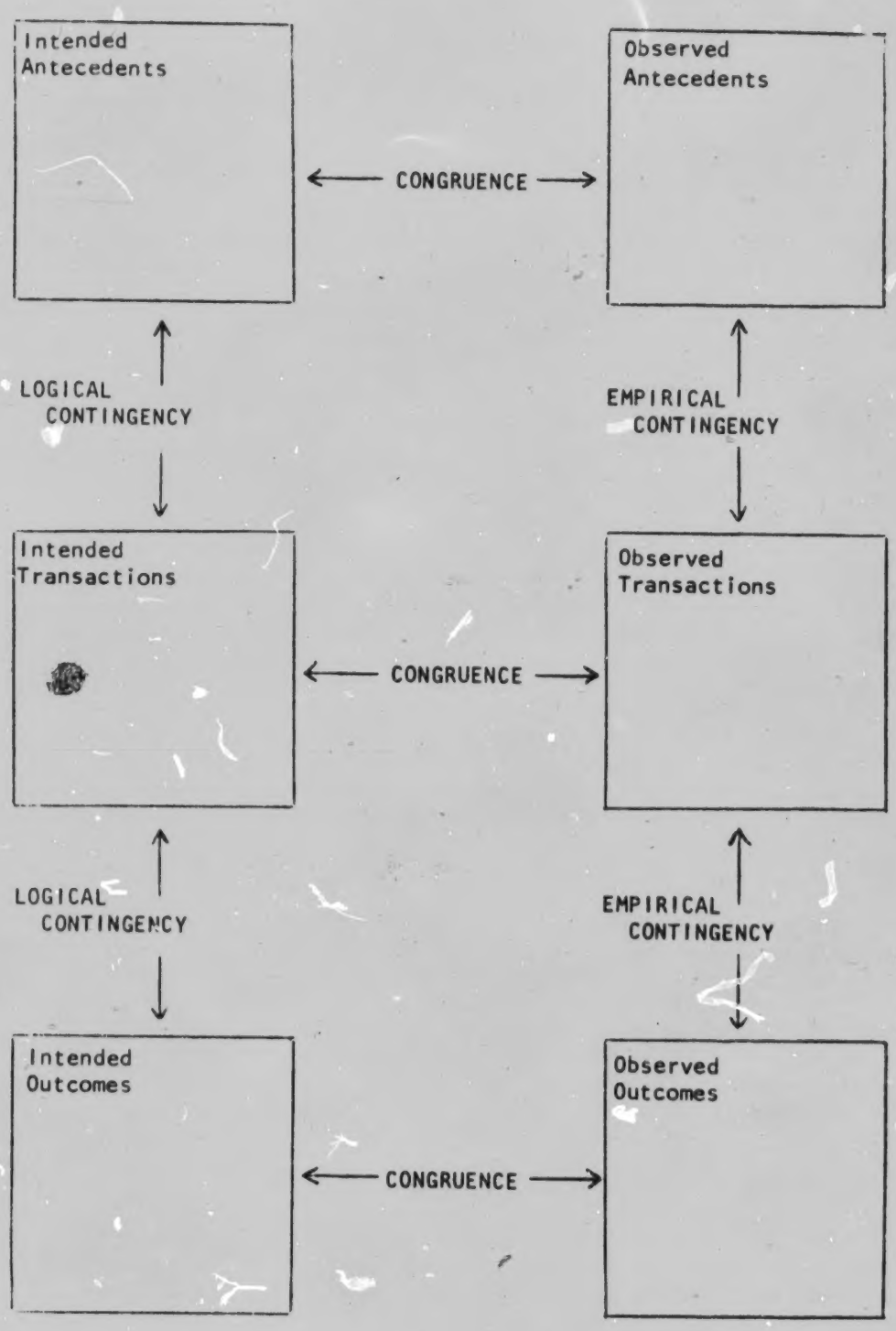

Figure 8. A representation of the processing of descriptive data.[1]

[1] Reprinted with permission from Stake, R. E. The countenance of educational evaluation. Teachers College Record, 1967, 68(7), p. 533.

These same types of consistency are defined in the modified information matrix (see Figure 5). Contingencies are defined between antecedents, transactions, outcomes and standards. Congruencies are defined between expected, actual, and ideal (see Figure 5).

Although consistency of information within matrices has been modeled well theoretically, the underlying logic which would accompany a determination of when inconsistency should be expected and how much inconsistency should be tolerated has not been determined. It should be noted that some inconsistencies should be tolerated and expected. For example, one may always expect a discrepancy between "actual" and "ideal" outcomes. Furthermore, no methods have been devised for examining the consistency/non-consistency problem.

Between matrix consistency is also of importance in the present context. Of concern here is whether or not the consumer's situation matches the instructional material being proposed as an object in the evaluation problem situation. As indicated previously, there is different information, although it can be classified using the same schemata, which derives from the material or the consumer's situation (see Figures 5 and 9).

Consistency and/or non-consistency between consumer situations and particular materials is illustrated in Figure 10. The level of consistency would lead to the determination of which material to choose in the earlier posited evaluation problem.

The materials information classification matrix is shown in Figure 5 along with the methods for the acquisition of the information for filling the matrix. A similar matrix (i.e., the same categories) is shown in Figure 9 for classifying the information which derives from the consumer's situation. Methods for collecting the information about consumer's situations are indicated using Roman numeral V and A and B to indicate different methods for collecting the information. The particular methods are more completely detailed in these sections of the SOURCEBOOK. These methods are considered to be Level V types of information collection methods and occur together in the Level V section of the SOURCEBOOK.

Evaluation Methods

Of ultimate concern within an evaluation problem situation is the way the information once collected is summarized for utilization in the decision-making process. Although a model has been formalized to the extent of providing a guide to the inclusion of the critical elements in an evaluation problem situation, it does not nor can it provide specific means for collecting, prioritorizing, weighting, eliminating, synthesizing and summarizing the information obtained. A description of this problem has been provided:

		Expected	Actual	Ideal
Conditions of Use	ANTECEDENTS			
	Media	VB		
	Curriculum	VB		
	Environment	VB		
	Teachers	VB		
	Learners	VA VB		
	TRANSACTIONS			
	Instruction			
Results of Use	OUTCOMES (Direct)			
	Cognitive	VA VB		
	Affect	VA VB		
	Psychomotor	VA VB		
	OUTCOMES (Indirect)			
	Media			
	Curriculum			
	Environment			
	Teachers			
	Learners			
	Instruction			
	STANDARDS			
	Absolute			
	Relative			

Figure 9. Consumer's situational information

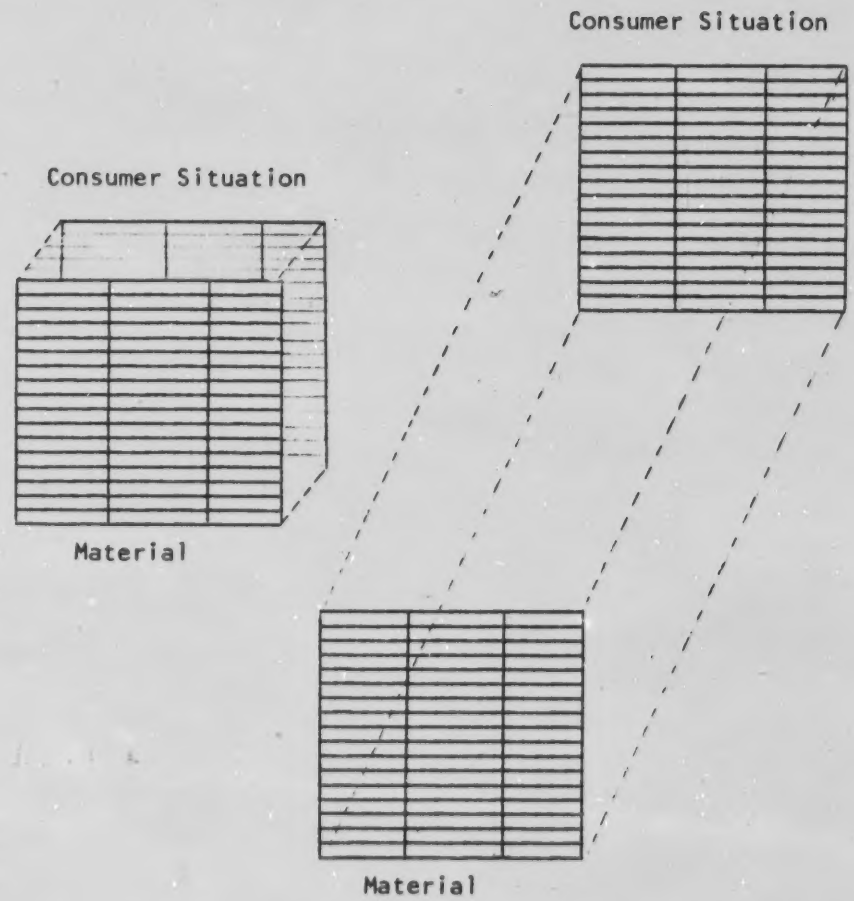

Figure 10. Material and consumer situation consistency

Key:
---Level of Consistency.

"Evaluation data are worthless no matter how impeccably they are gathered if they are capriciously or unintelligently combined into value-judgments affecting decisions. The weightings which are to be applied to performance scales to determine the composite value of alternatives must be made public and must be studied explicitly by the evaluator" (Glass, in press).

The solution to the problem lies in the explicit specification of the means by which composite and multidimensional data are summarized by the methods used to derive particular summarized results. Once this is done, methods used within the evaluation problem situations can be evaluated to determine whether the procedures, strategies and summarization techniques do in fact meet certain standards when implemented under certain prescribed conditions for the purposes of obtaining adequate decision-making information.

The evaluation process is cyclic and formative. Therefore, those involved with the evaluation of instructional materials and media must not only be concerned with the decisions, conclusions and judgments made relative to materials as objects in evaluation problem situations, but they must also be concerned with the evaluation of methods and, consequently, the perfecting of the science. The SOURCEBOOK provides a number of methods for the collection of instructional materials and media information from a variety of sources. The types of information which can be collected, analyzed and summarized are more completely detailed in the various sections of the SOURCEBOOK.

It is hoped that through the use of these procedures and methods new information will be provided for use in solving evaluation problems posited by consumers. The data provided from the use of the proposed methods to evaluate can also be used formatively to improve the procedures.

Many problems for study can be identified within the area of instructional materials and media evaluation. The charge now is to stop talking about them and to start collecting the necessary information to solve them.

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Level I. IDENTIFICATION[1] AND CLASSIFICATION[2]

Part A. A System for the Identification and Classification of Instructional Materials and Media

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[1] Identification refers to the unique numbers and words which are used to refer to a specific instructional material to uniquely identify that instructional material for the consumer.

[2] Classification refers to the process of analyzing a material using well-defined procedures and assigning specific descriptors to that material which categorize and describe the material for potential educational use.

A SYSTEM FOR THE IDENTIFICATION AND CLASSIFICATION OF INSTRUCTIONAL MATERIALS AND MEDIA

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Special Education Instructional Materials Center

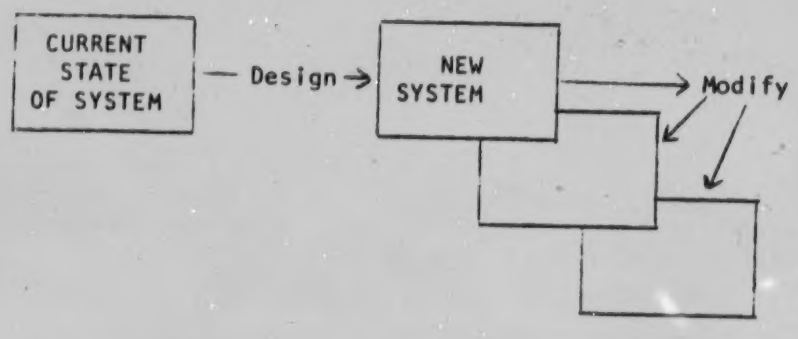
Introduction

A system for the identification and classification of instructional materials and media is a basic element in any total evaluation system. Prior to making judgmental decisions about a material, it is necessary to be able to uniquely describe the material so that others may make effective use of the evaluative information. The problem facing the IMC/RMC/RRC Network is the adoption of a standard set of categories so that all identification and classification of instructional materials may be shared without the problem of "missing information." This paper offers such a set of categories as a starting point in the development of a multi-user system.

A systematic approach is outlined in this paper whereby existing identification and classification systems have been examined, have been compared, judgmental options have been excluded and conclusions have been drawn relative to two existing systems that seem to contain a large percentage of options explored in other systems.

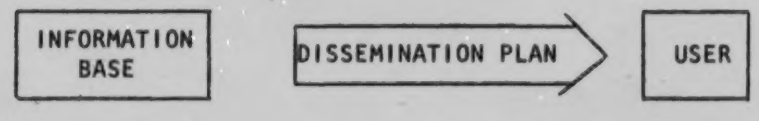
System Requirements

The development of a unified system for the identification and classification of instructional materials requires a number of separate actions. First, it is necessary to examine and ascertain the definable components of existing systems. This in itself is a difficult task since a large percentage of existing systems contain little documentation. Next, an initial working system must be created that can be continually improved and modified through information collected about how the system functions.



To attempt to develop a "perfect" operational system at the "first pass" would certainly present the possibility of creating a non-functional system that is not responsive to needed modifications that may surface in the future. The charge, then, in creating a system for the identification and classification of instructional materials and/or media is to develop a system that is responsive to the needs of the system users. Responsiveness must be the initial impetus for the original design of the system (based on what has occurred in the past and the impetus to keep the system growing; built on operational feedback that provides direction to the system based on the results of what the system attempts).

Appropriate feedback to such an identification and classification system must be contingent upon the careful examination of the interaction of two components. Typically, the system is entirely built around the development of an information base. As such, little attention is paid to the user referent and the viability of the information base as seen by the user. The question of dissemination of the information must be examined early in the development of such a system to increase the probability that the information will, in fact, get to the user and be used. The development of the dissemination plan must be parallel to the development of the information base. By so doing, the likelihood of actually disseminating the information will be increased.



Fulfilling National Needs

The most basic part of any system for the identification and classification of instructional materials and/or media is the utilization of a reliable set of categorical descriptors. Such a set of descriptors serves to: (1) provide for the unique identification and location of a particular instructional material and/or media; (2) provide for the grouping of materials and/or media for comparative purposes; (3) provide basic objective information about individual materials; (4) assist in the cataloging and retrieval of materials; and (5) promote unified collection of information about materials. To date there have been many attempts to establish systems of categorical descriptors at local levels. Such systems have, to varying extents, fulfilled local needs. There has been, however, no national effort to design a set of categorical descriptors that will meet the needs of all users. This paper addresses itself to a procedure for creating such a national system. The unique aspect of this description is its foundation in existing systems as a base for the responsive development of a system that will serve its users.

An Examination of Current Systems

There are a number of currently used systems and also systems that have been abandoned that provide an excellent overview of the wealth of aspects that must be covered in a national system. The following matrices present a comparative look at a number of these systems. It was found that a natural dividing point existed in the types of items included on the various forms. Matrix A shows objective information of a strictly identification nature (see Figure 1). Matrix B presents a comparison of items of a classification nature calling for more subjective analysis by the individual completing the form (see 11 forms, Figure 2). The 11 forms that were analyzed are denoted by the letters "A" through "K"[1] (see Appendix A).

A comparison of the forms displayed in Matrix A shows: (1) Form K is most comprehensive; (2) the most often included items are title, category (disability area), author, date, publication date, price and source (producer); and (3) Form K includes a greater number of items that are appropriate for a national system for the identification of instructional materials and/or media (see Figure 1).[2]

A comparison of the forms displayed in Matrix B shows: (1) a large difference in the number of items on each form (low = 2, high = 16); (2) a range in items from non-judgmental (descriptive) to judgmental; (3) the most often included items are educational level, content, purpose (objective), group setting and learner skills; and (4) Form B includes all five of the most often included items listed above.

In examining Matrix B (see Figure 2), there are found a number of items included that can be considered of a judgmental nature. Since the purpose of this paper is to investigate nonjudgmental items, the following items were eliminated from consideration due to their judgmental nature: accuracy, adequacy, appropriateness, attractiveness, clarity, compatibility, effectiveness, flexibility, informative, motivation, relevancy, technical quality and variety.

The following six items are seen as highly specific and not general enough to be used to describe a great variety of instructional materials: illustrations, IQ, literary style, mental age, repetition and vocabulary. The exclusion of these 19 items from Matrix B leaves a total of 22 items remaining. The following percentages are found when each form is compared with the 22 selected items.

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[1] The 11 forms analyzed in the matrices were obtained from the CEC Information Center, the MWERC and SEIMC's at George Washington University, University of Kansas, University of Kentucky, Michigan State University, New York, University of Oregon, University of Southern Florida and the Pennsylvania Regional Resource Center.

[2] This paragraph was modified by the Editor to include Form "K" in the analysis.

MATRIX A

Identification Information

Information	A	B	C	D	E	F	G	H	I	J	K
National Accession #	X										X
Creator Source											X
Publisher Source	X	X	X					X			X
Distributor Source	X										X
Title	X	X	X	X	X	X	X	X	X	X	X
Edition											X
Program Note											X
Author											X
Copyright Holder											X
Copyright Date(s)											X
Publication Date	X	X	X					X			X
Pagination											X
Suppliers ID#											X
Location ID#	X	X									X
Library of Congress ID#											X
Network# (IMC, RMC, School)	X										X
Standard Book#											X
International Standard Book#											X
Price	X		X	X				X			X
Format (Form Designation)	X	X									X
Supplementary Notes											X
Surrogate											X
Quantity											X
Journal	X										
Series Title and #	X										
Date of Record	X				X	X			X		
Availability	X										
Category	X			X	X	X	X	X	X		X

Figure 1. Forms by identification information

MATRIX B

Classification Information

	A	B	C	D	E	F	G	H	I	J	K
Accuracy										X	
Adequacy										X	
Appropriateness									X	X	
Attractiveness				X				X			
Chronological Age					X			X	X		
Clarity										X	
Compatability				X							
Content		X	X	X	X			X			
Curricular Function					X	X		X			
Description	X	X	X								
Educational (Instructional) Level		X	X	X		X	X		X	X	
Effectiveness	X						X			X	
Entering Task		X									
Equipment Needed		X			X						
Flexibility										X	
Follow up											
Group Setting		X			X		X	X		X	
Illustrations				X							
Informative										X	
Input Mode		X									
Interest Level				X					X	X	
IQ									X		
Learner Skills		X	X		X			X			
Literary Style				X							
Mental Age						X					
Motivation									X	X	
Organization				X						X	
Output Mode		X									
Physical Characteristics					X		X			X	
Procedure								X			
Purpose (Objective)		X	X				X		X	X	
Relevancy										X	
Repetition				X							
Storage				X							
Supplemental Activities				X							
Teacher Manual				X	X			X			
Technical Quality				X				X	X		
Time Needed		X			X						
Training Needed								X			
Variety				X							
Vocabulary				X							

Figure 2. Forms by classification information

FORM	% of "22" included in form
A	4.5%
B	54.5%
C	22.7%
D	31.8%
E	27.2%
F	13.6%
G	18.1%
H	36.3%
I	18.1%
J	27.2%
K	0.0%

This analysis shows Form B as containing the most conclusive set of classification items of the 11 forms that were examined.

The following changes, however, should be made in Form B to broaden its scope based on the information examined: (1) chronological age, curricular function, interest level and teacher manual should be included; and (2) entering task, follow up, input mode and output mode should be excluded.

A Recommended Procedure

Based on the analysis on the 11 forms, it is suggested that Form K[3] be used for the identification and Form B[4] (with minor modification) be used for the classification of instructional materials and media. Ideally, these forms would be used in a complementary manner to provide a single vehicle for the collection of identification and classification information. Thirty-three items are suggested as a starting point for the identification and classification of instructional materials and media (see Table 1).

Reliability of the Information Collected

A recurring problem in the collection of information about instructional materials is the interpretive differences found between those persons collecting data. These differences appear at two levels. First, and the hardest to control, is the judgmental decisions made regarding the value of a material. In the combined use of either Form K or B as amended, this aspect of reliability should be controlled through the use of non-judgmental items. The second problem is in the specificity or understanding of the items and the type of information required. This can be accommodated through the use of a guide to accompany the form. Such a guide would provide explicit definitions and directions for filling in each item.

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[3] A more detailed discussion of the rationale development and results of use of Form K are provided in the SOURCEBOOK (see Neleon and Thornton, Level I, Part B).

[4] A more detailed discussion of the rationale, development and procedures for use of Form B can be found in the SOURCEBOOK (see Rude, Level I, Part C, Classification).

TABLE I

SUGGESTED ITEMS FOR THE IDENTIFICATION AND CLASSIFICATION OF INSTRUCTIONAL MATERIALS AND MEDIA

Identification	Classification
National Accession #	Chronological Age
Creator Source	Content
Publisher Source	Curricular Function
Distributor Source	Description
Title	Educational (Instructional Level)
Edition	Equipment Needed
Program Note	Group Setting
Author	Interest Level
Copyright Holder	Learner Skills
Copyright Date(s)	Organization
Publication Date	Physical Characteristics
Pagination	Procedure
Suppliers ID#	Purpose (Objective)
Location ID#	Storage
Library of Congress ID#	Supplemental Activities
Network# (IMC,RMC, School)	Teacher Manual
Standard Book#	Time Needed
International Standard Book Number	Training Needed
Price	
Format (Form Designation)	
Supplementary Notes	
Surrogate	
Quantity	
Journal	
Series Title and #	
Date of Record	
Availability	
Category	

Guides have already been developed for both Forms K and B (see Rude, Level I, Part B, Appendix A; and see Nelson and Thornton, Level I, Part C, Appendix A, in the SOURCEBOOK). Inter-rater reliability can be examined after both forms have been utilized for a short period of time to uncover specific weaknesses in the guides of items. If an item is found to vary greatly among different raters and it is impossible to decrease the variance through changes in the guide, the item can be considered judgmental and should, therefore, be considered for exclusion from the form.

Format for Collection and Dissemination of Information

There is a great difference found in the existing formats utilized for the collection and dissemination of information about instructional materials. Formats range from simple prose descriptions to complex computer programs and printouts. It is suggested that no single format be adopted at this time for collection and dissemination. By allowing individual groups to design their own format around the items specified in this paper, it should provide further opportunity to examine the effectiveness of the formats. The important aspect is that all groups utilize the same common set of items.

Conclusion

The preceding discussion has focused on the creation of a viable national system for the identification and classification of instructional materials and/or media. This system would form one module or level of a larger system for the evaluation of instructional materials and/or media. Such a comprehensive system would form the basis of an information base to allow teachers to select instructional materials in a more defined manner.

APPENDIX A

Materials Information Forms

FORM A

Special Education Network

Instructional Materials Centers — Regional Media Centers

CATALOGING FORMAT*

Draft - June, 1973

Field 1 - National system identification number, to be assigned by a national authority

Field 2 - Local system identification number, Optional

Field 3 - Title (including sub-title and/or alternative forms, such as inversions, truncations, acronyms), Edition Data

Field 4 - Journal/Excerpt, aggregate form from which the material abstract is taken

Field 5 - Series title and number

Field 6 - Author(s) (Last name first, first name, middle initial) up to two authors, if more than two list as "and others"

Field 7 - Publication Date

Field 8 - Form designation and physical description of material, from Instructional Materials Thesaurus for Special Education

Field 9 - Price, Funding Source, such as Title VI, etc.

Field 10 - Date of which information recorded, Optional

Field 11 - Source (National) includes complete address

Field 12 - Source (Local) Optional, includes complete address

Field 13 - Availability location (IMC/RMC) to be coordinated by a national authority

Field 14 - Intra-regional availability, associate centers, Optional

Field 15 - Category (Disability/Interest) Optional

Field 16 - Descriptors and/or local identifiers, user key

Field 17 - Abstract or description not to include information found in previous fields and date information recorded

Field 18 - Reported evaluation data

*Devised by Information Systems Development Committee, SEIMC/RMC Network

Jefferson Plaza • 1411 South Jefferson Davis Highway • Suite 928 • Arlington, Virginia 22202 • Phone 703-920-7770

FORM B

Content Descriptor
Code Numbers:

A. Title-Author:

B. Publisher-Date:

C. Major Skill Area:

A. Readiness
1. Motor
2. Auditory
3. Visual
4. Academic

B. Reading
1. Phonics
2. Comprehension
3. Structural Analysis & Vocabulary Development
4. Study Skills
5. Literature
6. Reading Programs

C. Language Arts
1. English, Grammar & Composition
2. Handwriting
3. Spelling
4. Speech & Language Development

D. Math
1. Numeration
2. Addition
3. Subtraction
4. Multiplication
5. Division
6. Fractions
7. Money, Time, Measurement, Geometry
8. Other

Other:

D. Content (Specific Skill)

E. Instructional Level: Grade_____, P A B C D E F G O

F. Cognitive Ability: (not included at this time)

G. Input Mode: 1) Auditory 2) Visual 3) Motor 4) Auditory-Vis. 5) Visual-Motor 6) Autidory-Motor 7) Auditory-Visual-Motor

H. Format

I. Additional Equipment:

J. Output Mode: 1) Verbal 2) Motor_____ 3) Verbal-Motor 4) No specific response

K. Time:

L. Teacher/Learner Interaction: Independent, teacher directed.
Large group, small group, individual.

M. Objective:

N. Entering Task:

O. Summary:

P. Caution:

Q. Follow Up:

MERC
Ed. Tech
10-72

FORM C

MAR-SEIMC
Materials Evaluation Form

1. Name of Material _____

2. Acquisition # _____

3. Educational Setting:
   a) level (pre-primary, primary, etc.) _____

   b) Pupils diagnosed as _____ or description of children___

   _____

   c) Chronological age range of pupils _____

   d) Type of program (diagnostic, resource-crisis, treatment center, etc.)

   _____

   IF YOU USED THE MATERIAL:

4. Describe <u>why</u> you used the material. _____

   _____

   _____

   _____

5. Was the material used for (check one space per line)
   a) ____ supervised activity ____ independent activity
   b) ____ individual ____ group

6. Describe <u>how</u> you used the material. _____

   _____

   _____

   _____

7. Was the material effective? ____ yes ____ no Why? _____

   _____

   _____

   _____

Form C continued...

8. Physical characteristics of material:
   a) Durable? ____yes ____no
   b) Reusable? ____yes ____no
   c) Easy to use? ____yes ____no
   d) Attractive to pupils? ____yes ____no

9. How could the material be improved? _____

_____

_____

_____

10. Comments (strengths, weaknesses; pupils' reactions, etc.) _____

_____

_____

_____

_____

_____

11. How could this evaluation form be improved? _____

_____

_____

_____

_____

FORM D

Do you plan to buy this material?

Yes ____ No ____

KU-SEIMC

Material Evaluation Form

Please complete the attached form, being as specific as possible, and return it with the materials. We will then attempt to analyze the members' comments and be able to make more specific recommendations for the use of materials available.

MATERIAL USED

Author: _____

Title or Series: _____

Date(s) used: _____

Type of classroom or group: _____

Area of Instruction: _____

	Aged of child for which material used:	Appropriate for children of what ages:
Chronological Age	_____	_____
Mental Age	_____	_____
Educational Level	_____	_____

OPINIONS OF THE MATERIAL

1. How was it appropriate or not appropriate for your type of class, age group and I.Q. range?

Form D...continued

Material Evaluation Form

2. What group or groups do you think could benefit from the use of it?

3. Does it do what it's designed to do?

4. Would you recommend it be used with other materials, tapes, records, programs, etc.? If so, what?

FORM E

UNIVERSITY OF KENTUCKY
REGIONAL SPECIAL EDUCATION INSTRUCTIONAL MATERIALS CENTER

Evaluation Form for Instructional Materials

Title _____ Date _____

Evaluator's Name _____ M _____ F _____

I. Directions: For each of the following variables, indicate your judgment of the effectiveness of this material by circling the appropriate number. Should a statement not apply, check the line labelled "Not Applicable."

1 = poor
2 = below average
3 = average
4 = above average
5 = excellent

		Not Applicable
A. Curriculum emphasis:		
1. Fits into existing curriculum	1 2 3 4 5	____
2. Can be correlated with other phases of curriculum	1 2 3 4 5	____
3. Helps accomplish objectives of curriculum	1 2 3 4 5	____
B. Content:		
4. Organized for sequential development of concepts/skills	1 2 3 4 5	____
5. Opportunities provided for students to practice and maintain concepts/skills	1 2 3 4 5	____
6. Provisions made to evaluate process	1 2 3 4 5	____
7. Opportunities provided for student exploration, problem solving and/or discovery	1 2 3 4 5	____
8. Allows flexibility; provides for individual differences	1 2 3 4 5	____
9. Continued value and use	1 2 3 4 5	____
10. Multi-sensory in approach	1 2 3 4 5	____
C. Appropriateness:		
11. Content	1 2 3 4 5	____
12. Interest level	1 2 3 4 5	____
13. Reading level	1 2 3 4 5	____
14. Vocabulary	1 2 3 4 5	____
15. Graphic illustrations	1 2 3 4 5	____
D. Instructions:		
16. For teacher are clear, concise and easily understood	1 2 3 4 5	____
17. For student are appropriate and easily followed	1 2 3 4 5	____
18. Allow independent use by student	1 2 3 4 5	____
E. Physical Characteristics:		
19. Format	1 2 3 4 5	____
20. Type size, paper, binding, material used in construction	1 2 3 4 5	____

Form E...continued

		Not Applicable
21. Size, number of parts, portability, storage factor	1 2 3 4 5	____
22. Durability	1 2 3 4 5	____

F. Please check yes or no on the next two statements

23. Requires in-service training by users yes___ no___
24. Best material available for the expenditure yes___ no___

H. Directions: please answer the following questions. Be as specific as possible.

1. In your opinion, what skills can be taught with this instructional material?

2. How much teacher time is involved in (a) preparing each lesson _____ and (b) teaching each lesson? _____

3. What group size would you recommend for optimal use? _____

4. With what types of children could this material be used?

5. What is the best feature of this material?

6. What is the worst feature of this material?

7. If you were giving suggestions to the publisher, what changes would you suggest to make the material more acceptable?

8. Can this material be used exclusively to teach a particular skill, or should it be used to supplement other instructional program? If the latter, please explain.

9. Please make any additional comments concerning this material.

FORM F

USOE/MSU Instructional Materials Center for Handicapped Children and Youth

Evaluation of an Instructional Material for the Handicapped

1. Trade name of item:

2. Publisher or producer's name:

3. Publisher or producer's address:

4. Copyright or production date, if given:

5. 15-25 word description of the item and its use (over):

6. Handicap for which it is most relevant:

7. How long have you used it? Week, month, year, longer:

8. Were you or did you use it before being asked to prepare this evaluation? yes/no

9. Are its contents and/or subject matter relevant and accurate? yes/no, or explain:

10. Is it attractive to pupils? yes/no, or explain:

11. Is it adequately durable? yes/no

12. Is the teacher manual or instruction booklet adequate? yes/no/ there is none

13. Is its use educationally sound? yes/no, if no, explain:

14. Does its teaching value or effectiveness justify its cost? yes/no

15. Is the use you make of this substantially what the producer recommends or intends? yes/no, if no, please clarify:

16. Would some special teacher training be advisable in order to make effective use of it? yes/no

17. CIRCLE (below) the age of the pupils and the teaching tasks for which you have used the material:

18. CHECK ( ) other ages or functions for which you would expect this material, as it stands (without modification), to be useful.

    AGE: 1-3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
    Learning Characteristics: Fast, average, slow, all
    Curricular Function: Regular, supplementary, remedial
    Teaching Procedure: Group, small group, unsupervised study

19. Comments:

FORM G

THE NEW YORK STATE SPECIAL EDUCATION
INSTRUCTIONAL MATERIALS CENTER'S SYSTEM

User Reaction Form
to be used with
Instructional Materials
Borrowed from New York State Centers

On the following page you will find a user reaction form. It would be appreciated if you would use this sheet to evaluate the SEIMC materials you are presently using or planning to use. We would like to know your reaction to the form itself. Is it adequate? Would you prefer another format? If so, what? Are there other facets which should be included? Any suggestions which you can give which would make the evaluation forms more effective from your standpoint will be given every consideration.

Please return evaluation form, with material borrowed, to your Regional SEIMC.

THE UNIVERSITY OF THE STATE OF NEW YORK
The State Education Department
Division for Handicapped Children
Albany, New York

Form G...continued

New York State

S E I M C System

User Reaction for Instructional Materials

Center ID Number _____

Author: _____

Title: _____

Date(s) used: _____

Handicap(s) of child(ren) with whom material was used: _____

_____

Chron. Age (range) _____ IQ (range) _____

Educational Level _____

APPRAISAL

Content: _____

How does it make a contribution to learning?

Circle appropriate rating: 5-excellent 4-good 3-fair 2-poor 1-unsatisfactory

Appropriateness 5 4 3 2 1

Your basis for such a rating: _____

_____

_____

Interest 5 4 3 2 1

Your basis for such a rating: _____

_____

_____

Motivation 5 4 3 2 1

Your basis for such a rating: _____

_____

_____

Technical Quality 5 4 3 2 1

Your basis for such a rating: _____

_____

_____

Would you use this material again? _____

If so, for what purpose? _____

What other uses can you suggest? _____

ADDITIONAL COMMENTS: (use other side)

Name of user _____

School _____ Address _____

Years of teaching experience _____(Total)_____(Spec. Ed.)

FORM H

TEACHER: COMPLETE, AND RETURN TO SEIMC WITH THE MATERIALS

1. Number of pupils with whom materials were used ____

You are a

2. ____ Regular class teacher
3. ____ Special class teacher
____ Other (please specify) _____

With what type of children did you use these materials?

4. ____ EMR
5. ____ Physically handicapped
6. ____ Speech impaired
7. ____ Multiply handicapped
8. ____ Partially sighted or blind
9. ____ Hard of hearing or deaf
____ Other (please specify) _____

School placement of children using the materials

10. ____ Preschool
11. ____ Primary
12. ____ Intermediate
13. ____ Junior high
14. ____ Senior high

Instructional purpose

15. ____ Reading
16. ____ Arithmetic (Math)
17. ____ Social Studies
18. ____ Sciences
19. ____ Language Arts
20. ____ P.E.
21. ____ Music and Art
____ Other (please specify) _____

Location of your class

22. ____ Public day school
____ Other (please specify) _____

FOR OFFICE USE ONLY

23. ____

24. Name of Material (if necessary specify series and/or level) _____

Date sent ____ Date returned ____ 25. Condition upon return: Poor Fair Good Excellent

Check the items below which best describe the value of this material for your instructional purposes.

26. ____ Durable
27. ____ Mediocre
28. ____ Exciting
29. ____ Disorganized
30. ____ Attractive
31. ____ Practical
32. ____ Inflexible
33. ____ Entertaining
34. ____ Not revelant
35. ____ Unclear
36. ____ Reusable
37. ____ Challenging
38. ____ Boring
39. ____ Informative
40. ____ Inadequate
41. ____ Instructional
42. ____ Inappropriate
43. ____ Effective
44. ____ Unenjoyable
45. ____ Inaccurate
46. ____ For small group use
47. ____ For individual use
48. ____ Easy to manage
49. ____ Suitable length
50. ____ Interesting to students

Other (please specify) _____

51. Would you use this material again? Yes____ No____

52. Is this material readily available to you through any source other than the SEIMC? Yes____ No____

Comments and/or explanations (if you wish) _____

SEIMC MATERIALS USE RESPONSE CARD

FORM I

USERS OF EVALUATION MATERIALS

1. Material used:

2. Author:

3. Title:

4. Date(s) used:

5. Used with:

_____ Educable Mentally Retarded	_____ Visually Impaired
_____ Trainable Mentally Retarded	_____ Specific Learning Disability
_____ Hearing Impaired	_____ Crippled
_____ Speech Impaired	_____ Hospitalized or Handicapped
_____ Emotionally Disturbed	_____ Other

6. Estimation of the level of instruction for which the material is suitable.

Pre-School	Kinder-garten	Prim.	Ele.	Jr. High	Sr. High	Other

7. Estimation of the interest level.

Pre-School	Kinder-garten	Prim.	Ele.	Jr. High	Sr. High	Other

8. Estimation of content type.

Voc.	Math	Eng.	Lang. oral	Lang. writ.	Lang. read.	Sci.	Art Craft	Soc. Sci.

9. Estimation of difficulty of author's literary style.

very difficult	difficult	avg.	easy	too easy for grade level

10. Estimation of variety in approach to instruction

Great Variety	Much Variety	Avg.	Poor Variety	No Variety

Form I...continued

11. Suitability of the material for use in currently established curricular programs.

Highly Suitable	Very Suitable	Adequate	Poor Suitability	Not Advised

12. Effectiveness of material in aiding remediation.

Extremely Helpful	Very Helpful	Adequately Helpful	Little Value	No Value

13. Compatibility of the material and/or method with other material. Please specify the material and/or method.

1. _____

Highly Easy	Easy	Adequately Easy	Less Easy	Harder

2. _____

Require more Preparation	Sufficient Preparation	Adequate Preparation	Less Preparation

14. Teaching guide or instruction for use.
Present ___ Not Present ___
(if present, mark the following)

Highly Organized	Well Organized	Less Org.	Adeq. Organized	Poor

15. Organization of the materials.

Highly Org.	Well Org.	Less Org.	Adeq. Org.	Poor

16. Relationship of illustrations to context.

Very Close	Close	Adequate	Fairly Close	Poor

17. Research using the material.

Considerable	Mod.	Av.	Little	None	Other

18. Vocabulary control.

Highly Control.	Well Control.	Avg.	Fair Control.	Poor Control.

19. Concept introduction load.

Very High	High	Average	Low	Very Low

Form I...continued

20. Supplemental activities and materials.

Well Done	Much Available	Some Available	Little Available	None Available

21. Estimation of exercise repetition.

Very much	Much	Avg.	Little	Very Little

22. Cost factor

Highly Reasonable	Very Reasonable	Adequately Reasonable	Poor

23. Attractiveness of the material for children

Highly	Very	Adequate	Fair	Poor

24. Quality of construction

Very Strong	Strong	Adequate	Flimsy	Poor

25. Storage

Easily	Well	Average	Poorly

26. Durability

Highly Durable	Very Durable	Adequate	Poor

FORM J

PrIMMIRS Master Card *SHELF NUMBER 060 6626

*TITLE THE DUSO KIT
*COPIES 1 *SERIES None listed
*AUTHORS None Listed
*SOURCE Early Childhood Education Learning Center, Dawson Hall, University of Georgia, Athens, GA 30601
*DATE 1973 *DESCRIPTION 20 Slides, Cassette and Script
*PRICE free
*DISABILITY Non-sensory, sensory

*LEVEL Professional Materials
*SUBJECTS Materials, Media, Evaluation,

*SKILLS

*CONTENT

This slide/sound series examines the content and the testing of the DUSO Kit from American Guidance Service. It repeats some of the suggestions in the kit for the use of various materials. The statement is made that "no research data are presented.... to show that the DUSO materials does actually change student behavior" and that "the classroom teacher will have to devise methods and techniques to systematically test the effectiveness of this program." However, the presentation makes clear that "tests which would yield hard data on attitude change do not exist at present." Nevertheless, the materials were believed to be well constructed.

Form I - continued

PriMAMIRS
Master
Card

ART
DRAMATICS
MUSIC/DANCE

COMMUNITY
CONSUMER EDUCATION
DRIVER EDUCATION
ETHICS/VALUES/ATTITUDES
HEALTH
HOMEMAKING
MOBILITY/TRAVEL
MONEY
SAFETY
SELF CARE SKILLS
SEX/FAMILY EDUCATION
TIME/SEASONS/HOLIDAYS

ALPHABETS
COMPOSITION
CONSONANTS
ENGLISH
HANDWRITING
LITERATURE
ORTHOGRAPHICS
PRONUNCIATION
SPEECH EXERCISES
SPELLING
VOCABULARY
VOWELS

ADDITION
DIVISION
FRACTIONS
HIGHER MATHEMATICS
MEASUREMENT
MULTIPLICATION
NUMBERS
SUBTRACTION

HANDICRAFTS
SPORTS

COLOR, SOUNDS
SIZE/SHAPES

ANATOMY/PHYSIOLOGY

CITIZENSHIP

OCCUPATIONS
PREVOCATIONAL ED
HISTORY
GEOGRAPHY
WRITING SKILLS
WORD STUDY SKILLS
VISUAL PERCEPTION
VISUAL MOTOR
TIME PERSPECTIVE
TRACKING
TACTUAL PERCEPTION
STUDY/MAP SKILLS
SPEECH SKILLS
SPACE ORIENTATION

AURAL
TACTILE
KINESTHETIC

ARTS
DAILY LIFE ACTIVITIES
LANGUAGE ARTS
MATHEMATICS
PHYSICAL EDUCATION/RECREATION
READINESS
SCIENCES
SOCIAL STUDIES
VOCATIONAL INTERESTS

SEQUENCED MATERIALS
MINORITY MATERIALS
GAMES FORMAT
NONCONVENTIONAL FORMATS

ACUITY
AFFECTIVE BEHAVIOR
AUDITORY PERCEPTION
BLENDING
BODY IMAGE
CLASSIFICATION
CLOSURE
COMPREHENSION
CREATIVITY
DIRECTIONALITY/LATERALITY
DIRECTION FOLLOWING
DISCRIMINATION
FIGURE GROUND PERCEPTION
FINE MOTOR
GROSS MOTOR
IMITATION
KINESTHETIC PERCEPTION
LISTENING SKILLS
LOGICAL THINKING
MEMORY
MOTOR DEVELOPMENT
MOVEMENT/BALANCE/AGILITY
MUSCULAR STRENGTH
NONVERBAL COMMUNICATION
OLFACTORY/GUSTATORY PERCEPTION
PART WHOLE RELATIONSHIPS
PROBLEM SOLVING
READING SKILLS
RHYMING
SELF CONCEPT
SEQUENCING
SOCIAL SKILLS
SOUND SYMBOL REL

FORM K

INVENTORY CUES

AND

ENGLISH LANGUAGE EQUIVALENTS

AC - accession number

TI - title

ED - edition

PN - program note

FT - format

AU - author

CD - copyright date

PD - publication date

SP - publisher source

SB - Standard Book Number

IB - International Standard Book Number

SI - supplier's identification number

LC - Library of Congress Number

CH - copyright holder

SC - creator source

SD - distributor source

PG - pagination

PR - price

SN - supplementary note

SU - surrogate

Level I. IDENTIFICATION AND CLASSIFICATION

Part B. Instructional Materials Identification

INSTRUCTIONAL MATERIALS IDENTIFICATION

William E. Nelson and Giselle S. Thornton
Pennsylvania Regional Resource Center

Identification refers to the process or the resultant end product of bibliographic (mediagraphic) cataloging which can serve as a direct reference for a specific and unique instructional material. Stated in more esoteric terms, that group of indicators and designators which will serve as a signature for an item to be reported and retrieved.

Included as indicators will be discriminable features of instructional materials which act in concert to identify with certainty a specific and unique instructional material. Nominative designators (titles) and numeric designators which can be firmly associated with an instructional material (or component) are also included.[1] The mediagraphic cataloging cues and their English language equivalents are shown in Table 1.

Procedures for obtaining and reporting the reference identification data elements were developed for the National Regional Resource Center for Special Education in Pennsylvania and employed to report the holdings of the Eastern Pennsylvania Regional Resources Center for Special Education as well as the holdings of selected target schools serviced by the National Regional Resource Center of Pennsylvania (NRRC/P).

Currently approximately 8,000 mediagraphic records are available and have been assigned unique identification numbers which will serve as direct reference for instructional materials in the state of Pennsylvania. Ultimately, the designers of the mediagraphic system visualize that the currently assigned accession numbers could be modified to form an identification designator useful in a national system for reporting and retrieving common holdings.

Existing records are currently being used to facilitate inventorying and reporting of new acquisitions of the Eastern Pennsylvania Regional Resources Center for Special Education and for identifying holdings of selected target schools serviced by the NRRC/P (Allentown, Pennsylvania).

The mediagraphic system derived responded to difficulties encountered by attempting to merge mediagraphic records provided from existing reporters of instructional material holdings or offerings. Identification

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[1] The set of indicators and designators under consideration and all information related to the findings for updating the guidelines are contained in a proposal submitted to the U.S. Office of Education, Bureau for the Education of the Handicapped, by Bucks County Intermediate Unit No. 2022, Administration Building, Doylestown, Pennsylvania 18901.

TABLE I

MEDIAGRAPHIC CATALOGING CUES
AND ENGLISH LANGUAGE EQUIVALENTS[1]

Mediagraphic Cataloging Cues	English Language Equivalents
AC	accession number
SC	creator source
SP	publisher source
SD	distributor source
TI	title
ED	edition
PN	program note
AU	author
CH	copyright holder
CD	copyright date(s)
PD	publication date
PG	pagination
SI	suppliers identification number
LI	location identification number
LC	Library of Congress identification number
RC	SEIMC or RMC number
SB	standard book number
IB	International Standard book number
PR	price
FP	format
SN	supplementary notes
SU	surrogate
QT	quantity

[1]Reprinted with permission from a proposal submitted to USOE/BEH by Bucks County Intermediate Unit No. 2022. Administration Building, Doylestown, Pennsylvania 18901.

information available from these records was not standardized with regard to the data element reported or with regard to the manner in which such elements were to be reported. Obviously, such systems have limited usefulness.

Guidelines for obtaining and reporting mediagraphic information were derived, incorporating many of the features of Committee on Scientific and Technical Information, A66 (COSATI). A year and a half of experience with NRRC/P guidelines for mediagraphic processing of instructional materials identification information has yielded findings for updating the guidelines (see Footnote 1) and support for the following conclusions:

1. Mediagraphic processing should be centralized for all network holders of special education instructional materials.

2. Institutions designated to perform the required and desired mediagraphic processing should be selected on the basis of willingness and intent to do such processing on an ongoing basis with provisions for preparing their mediagraphic records throughout the network in the form of listings and instructional materials packets useful for local identification of instructional materials to support shelving and retrieval of holdings.

3. Staff-acquired performed services associated with the processing of mediagraphic identification information should receive standardized training. Furthermore, they should be selected on the basis of competency to perform and motivation to remain active in the processing of such information.

4. Personnel involved in such efforts on an ongoing basis should be supported with an adaptive base of information to accommodate standardization of responses to varying instructional materials conditions (which may be anticipated). The conditions cue response information system in the previously cited proposal incorporates this feature. The guidelines, therefore, are not perceived as static; they must grow and be amenable to changes in the instructional materials domain

5. All mediagraphic identification information reported must be verified, supported and controlled for formatting and editing before being incorporated in a storage and retrieval system.

6. Provisions must be made to accommodate mediagraphic identification information which may change through time. At all times, however, the information reported must square with information available on the item (for which the data is reported) or with information in the most recent surrogate (the prior published information). This will entail archiving and dating information reported for each identification information element.

In order to uniquely identify, track and locate instructional materials to be fed into evaluative systems, a comprehensive instructional materials system is needed. The present system based upon mediagraphic cataloging offers such a system. Once the unique identifiers are attached to the material, it may then proceed to the next stage: classification.

A more detailed description of these mediagraphic cataloging procedures and how they can be utilized are provided in Appendices A and B. The forms which are used when doing mediagraphic cataloging are also provided in these appendices.

References

Committee on Scientific and Technical Information (COSATI): Federal Council for Science and Technology. Standards for descriptive cataloging of government scientific and technical reports. Revision No. 1, October, 1966.

APPENDIX A

Mediagraphic Processing Procedures

NATIONAL REGIONAL RESOURCE CENTER OF PENNSYLVANIA

MEDIAGRAPHIC PROCESSING

Guidelines for the Inventory
of Instructional Materials

Mary T. MacMullan
William E. Nelson
Giselle S. Thornton

July 2, 1973

GENERAL INSTRUCTIONS

1. Divide all instructional materials in the room according to sections which are convenient and efficient for inventory purposes.

2. A specific section will be assigned to you for inventory purposes. The assigning of work areas assures that you will not be duplicating inventory records and also eliminates the possibility of some materials being left unattended as you will be responsible for completing each section which has been assigned to you.

3. Establish a definite work pattern (e.g., left to right and top to bottom of a shelf) for each section being inventoried.

4. Pick up every instructional material and study it for all the information required to match with the relevant cue categories. It is vital that the information for these categories be very specifically attended to since there may be several reports recorded for certain materials. For example, if a match has been determined and an accession number recorded on a kit, it is essential to check the MASTER LISTING OF ALPHABETIZED TITLES OF INSTRUCTIONAL MATERIALS (MATIM)[1] further, as additional reports will have been drawn up for all functionally independent components contained therein. This is also true for books and other materials in a set since you will find both the set title and the individual book titles listed, and you must select the Master Accession Number of the specific item in that set. Therefore, do not make instantaneous decisions about whether there is a material to match. VERIFY by thoroughly checking the item to establish the match-up of all relevant cue information. Only with this level of specificity can an accurate inventory be assured.

5. Often times certain cue information will appear in parentheses. Whenever used, parentheses indicate that the enclosed information was not taken directly from the material itself, or the container you would expect to find it in, but from a surrogate reported under SU_ cue entry. Since all those surrogates listed will not necessarily be available for data verification at your location, concentrate first on matching all cue information <u>not</u> in parentheses.

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[1] Available from the Pennsylvania Regional Resource Center.

6. P R I N T all inventory data on the form which has been provided and use the assigned pen to record all information.

7. Record in the heading, information concerning the location code (to be assigned) the institution name and location, room number, the date of inventory and the name of the responder (your name).

8. Record all data on the inventory form horizontally and record only one entry per line.

INVENTORY PROCEDURES

When you have determined the title of an instructional material, check the MATIM to determine whether a report has been recorded for the material in hand. Material titles have been arranged alphabetically. For inventory purposes, beginning articles in titles have been retained, but alphabetization is according to the first major word in the title. If you can positively determine that there is a material match after verifying recorded cue information with the item in hand, then commence with the following procedures:

1. Record on the INVENTORY FORM the appropriate Master Accession Number for the corresponding material.
2. Under Quantity, record the total number of that instructional material in that particular room.
3. When available, record the Shelf Location Identification Number which has been assigned to this instructional material by the institution being inventoried.
4. When a verified match has been made, print the Master Accession Number on the white label and affix it to the corresponding material. Print and affix additional labels for each duplicate copy of that instructional material.
5. Whenever uncertainty exists about the match of materials, place a green dot label on the material. On the green form entitled QUESTIONABLE MATCHES, record the Master Accession Number for the material in question, the Quantity of the materials on hand for that reporting location and the Shelf Location Number. Under the column marked Cue Problems, report the cues for those categories of information which prevent the match of the materials.
6. When each section has been inventoried, hand count all those instructional materials for which there were no Mediagraphic Record matches. This will require a count of all those instructional materials which have no labels bearing the Master Accession Number or dots attached to them. Record this information on the yellow form entitled UNPROCESSED INSTRUCTIONAL MATERIALS. Completion of this step is essential as it will provide information regarding the number of man hours required for Mediagraphic Processing of those instructional materials at a future date.

INVENTORY CUES

AND

ENGLISH LANGUAGE EQUIVALENTS

AC - accession number

TI - title

ED - edition

PN - program note

FT - format

AU - author

CD - copyright date

PD - publication date

SP - publisher source

SB - Standard Book Number

IB - International Standard Book Number

SI - supplier's identification number

LC - Library of Congress Number

CH - copyright holder

SC - creator source

SD - distributor source

PG - pagination

PR - price

SN - supplementary note

SU - surrogate

CUE DEFINITIONS INFORMATION BACKGROUND

In order to properly inventory instructional materials, it is essential to familiarize yourself with certain categories of information and information-gathering procedures which will help in the selection of correct information when varied alternatives are presented.

AC_ An accession number is assigned for purposes of categorization and control. This number has already been established (contained in the MATIM printout) and needs now to be assigned specifically to those materials with which an absolute match has been made at each reporting location. Each functionally independent material has it own unique accession number.

TI_ A title should be a meaningful description of a specific instructional material. It is usually found on the title page of printed material or on containers in other media formats. Do not search for program, series or set information on the title entry line to precede the specific title, unless, a) the title as given is too general or not meaningful by itself and must include the program name, or, b) when it is the program or series as a whole which is being reported.

ED_ Edition or revision entry refers to a particular version or issue of a material. The words "edition" or "revision" usually appear directly on the material with the appropriate distinguishing edition information.

PN_ Program note, series and set titles are groupings of instructional materials which are reported in order from the largest organizational element to the smallest and are usually found on the item with the title.

FT_ The format cue is to indicate the media form of the item. Use of the supplier's language (what he calls it) is recorded when available.

AU_ Refers to the personal author(s), developer(s), or chief editor(s), etcetera, of a material. A maximum of two authors are named on this cue entry line, surname first, with an appending "and others" following the last named author when there are more than two.

CD_ All copyright dates found on the material are reported on the CD_ line.

PD_ Refers only to the most recent publication date as it is usually found on the title page or reverse of the title page.

SP_ The publisher/producer source is that corporate body preparing the instructional material for publication or production which is also responsible for its format and organization. This information is usually found directly on the material where its function is often cited.

SB_ The Standard Book Number, generally prefixed SBN, and the
IB_ International Standard Book Number, ISBN, are identification numbers for printed materials and are becoming more widely used. These numbers, when they are used, are often found on the reverse of the title page.

SI_ The supplier's identification number for a particular material is usually found imprinted on the item or on its container.

LC_ The Library of Congress Number, when used, is generally prefixed LCN and is usually found on the reverse of the title page.

CH_ Whenever an individual or individuals claim copyright privileges to a material rather than a corporate body, the name will be recorded, surname first, on the CH_ line exactly as it is printed on the material.

SC_ The creator source refers to that institutional or corporate body preparing the material which is also editorially and/or contractually responsible for its content. This information is usually found with the copyright imprint or in a statement in which creative responsibility is cited.

SD_ The distributor source is that corporate body responsible for the marketing of an instructional material. This information is usually found in the supplier's catalogs and in other surrogate references but may also appear directly on the instructional material.

PG_ The pagination count without enclosure by parenthesis, reflects the last numbered page on the material. The page count in parenthesis is the total number of pages or pieces containing a publisher-made impression. This means that all pages are counted as long as they are not blank.

PR_ Price information refers to that particular item named on the title line. When reporting a set, the set price was recorded on the price entry line; when a component was dealt with on the TI_ entry, the single price was reflected on the PR_ cue

entry. NPI represents no price indicated.

SN_ The supplementary note contains information which is relevant for identification purposes but does not occur frequently enough to warrant the creation of new entry cues. Reported here is information primarily concerning illustrators, sponsorship, and translation credits, and notes indicating the cooperative preparation of a material. Also included is copyright data referring to corporate bodies other than the one specified on the SC_ line.

SU_ Surrogate entry reflects the sources from which the reported information enclosed in parentheses was taken.

NATIONAL REGIONAL RESOURCE CENTER OF PENNSYLVANIA

MEDIAGRAPHIC PROCESSING
INVENTORY FORM

LOCATION CODE: _____ ROOM NUMBER: _____ DATE: _____

INSTITUTION NAME: _____ RESPONDER: _____

CITY: _____ STATE: _____

MASTER ACCESSION NUMBER	QUANTITY	SHELF LOCATION NUMBER

Developmental Form #2
6/1/73

NATIONAL REGIONAL RESOURCE CENTER OF PENNSYLVANIA

MEDIAGRAPHIC PROCESSING
QUESTIONABLE MATCHES

LOCATION CODE: _____ ROOM NUMBER: _____ DATE: _____

INSTITUTION NAME: _____ RESPONDER: _____

CITY: _____ STATE: _____

MASTER ACCESSION NUMBER	QUANTITY	CUE PROBLEMS					SHELF LOCATION NUMBER

Developmental Form #1
6/1/73

NATIONAL REGIONAL RESOURCE CENTER OF PENNSYLVANIA

MEDIAGRAPHIC PROCESSING
UNPROCESSED INSTRUCTIONAL MATERIALS

LOCATION CODE: _____ DATE: _____

INSTITUTION NAME: _____ RESPONDER: _____

CITY: _____ STATE: _____

ROOM NUMBER	QUANTITY	ROOM NUMBER	QUANTITY	ROOM NUMBER	QUANTITY

Developmental Form
6/1/73

NATIONAL REGIONAL RESOURCE CENTER OF PENNSYLVANIA
SPECIAL EDUCATION INSTRUCTIONAL MATERIALS
INFORMATION RECORD

LOCATION CODE _____

INSTITUTION NAME _____

CITY _____ STATE _____

RESPONDER _____ DATE _____

ROOM NOS.	QUANTITY

AC _____

TI _____

_____

ED _____

PN _____

FT _____

AU _____

CH _____

CD _____ PD _____

SC _____

SP _____

SD _____

SI _____ SB _____ IB _____ LC _____

PG _____

PR _____

SN _____

_____

SU _____

APPENDIX B

Level of Mediagraphic Processing Exemplar

NATIONAL REGIONAL RESOURCE CENTER OF PENNSYLVANIA

MEDIAGRAPHIC PROCESSING

INSTRUCTIONAL MATERIALS

LEVEL OF PROCESSING EXEMPLAR

August 15, 1973

BQ-3005 TI_ THE BOOKMARK READING PROGRAM - THE PRIMARY READERS
PN_ THE BOOKMARK READING PROGRAM
FT_ (KIT)
AU_ EARLY, MARGARET - SENIOR AUTHOR
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PR_ (NPI)
SN_ (INCLUDES LOOK, LISTEN, AND LEARN; SUN-UP; A HAPPY MORNING; A MAGIC AFTERNOON; SUN AND SHADOW; TOGETHER WE GO; A WORLD OF SURPRISES; GOING PLACES, SEEING PEOPLE; WIDENING CIRCLES; AND RING AROUND THE WORLD. COORDINATED TEACHER'S EDITIONS, READING SKILLS BOOKS, TEST BOOKLETS, DITTO MASTERS AND A SET OF RELATED MATERIALS FOR THE FIRST GRADE ARE ALSO AVAILABLE. EACH ITEM AVAILABLE SINGLY.)
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01)
QT_ (*)

BQ-2265 TI_ GOING PLACES, SEEING PEOPLE
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (BOOK)
AU_ COOPER, ELIZABETH K.
CD_ 1970
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ (0-15-332485-6)
SI_ (0-15-332485-6)
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 256P.
PR_ ($3.30)
SN_ (COORDINATED WITH DUPLICATING MASTERS VI, TEACHER'S EDITION OF READER 2-2 AND WORKBOOK, READING SKILLS SIX, AND TEST BOOKLET FOR GRADE 2.) ARTISTS: DON ALMQUIST, TED LEWIN, RAY AMEIJIDE, AND GRAHAM BOOTH. BOUND WITH TEXT IS BOOK, A TIME FOR FLOWERS BY MARK TAYLOR AND ILLUSTRATIONS BY GRAHAM BOOTH.
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-H)
QT_ (1)

BQ-2253 TI_ LOOK, LISTEN, AND LEARN
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (BOOK)
AU_ BURKE, MARGARET B.
CD_ 1971
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ 0-15-332330-2
SI_ 0-15-332330-2
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 62P. (68P.)
PR_ ($1.98)
SN_ (COORDINATED WITH TEACHER'S EDITION. CONTAINS A SET OF FLOCKED ALPHABET LETTERS IN EACH PUPIL TEXT.) ILLUSTRATED BY DENMAN HAMPSON.
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-A)
QT_ (1)

BQ-2256 TI_ A MAGIC AFTERNOON
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (BOOK)
AU_ COOPER, ELIZABETH K.
CD_ 1970
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ 0-15-332360-4
SI_ 0-15-332360-4
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 64P. (68P.)
PR_ ($0.99)
SN_ (COORDINATED WITH TEACHER'S EDITION FOR A HAPPY MORNING, A MAGIC AFTERNOON AND READING SKILLS TWO, NUMBER 0-15-332372-8; READING SKILLS TWO WORKBOOK, NUMBER 0-15-332370-1; AND DUPLICATING MASTERS II, NUMBER 0-15-332375-2.) ILLUSTRATIONS BY CHARLES C. FELLOWS.
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-D)
QT_ (1)

BQ-2258 TI_ READING SKILLS TWO
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (BOOK)
AU_ EARLY, MARGARET AND OTHERS
CD_ 1970
SP_ HARCOURT BRACE AND WORLD, INC., NEW YORK, N.Y.
SB_ (0-15-332372-8)
SI_ (0-15-332372-8)
SC_ HARCOURT BRACE AND WORLD, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 208P. (218P.)
PR_ ($5.70)
SN_ (COORDINATED WITH STUDENT TEXTS, A HAPPY MORNING, NUMBER 0-15-332355-8; A MAGIC AFTERNOON, NUMBER 0-15-332360-4; AND READING SKILLS TWO WORKBOOK, NUMBER 0-15-332370-1.)
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-D)
QT_ (1)

BQ-2257 TI_ READING SKILLS TWO FOR USE WITH A HAPPY MORNING AND A MAGIC AFTERNOON
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (WORKBOOK)
AU_ EARLY, MARGARET AND OTHERS
CD_ 1970
SP_ HARCOURT BRACE AND WORLD, INC., NEW YORK, N.Y.
SB_ (0-15-332370-1)
SI_ (0-15-332370-1)
SC_ HARCOURT BRACE AND WORLD, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 95P. (100P.)
PR_ ($0.99)
SN_ (COORDINATED WITH TEACHER'S EDITION FOR A HAPPY MORNING, A MAGIC AFTERNOON AND READING SKILLS TWO, NUMBER 0-15-332360-4; AND STUDENT TEXTS, A HAPPY MORNING NUMBER 0-15-332355-8, AND A MAGIC AFTERNOON NUMBER 0-15-332360-4.) ILLUSTRATED BY LLOYD P. BIRMINGHAM.
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-D)
QT_ (1)

BQ-2260 TI_ READING SKILLS THREE FOR USE WITH SUN AND SHADOW
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (WORKBOOK)
AU_ EARLY, MARGARET AND OTHERS
CD_ 1970
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ (0-15-332390-6)
SI_ (0-15-332390-6)
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 111P. (116P.)
PR_ ($0.99)
SN_ (COORDINATED WITH DUPLICATING MASTERS III, TEACHER'S EDITION OF PRIMER AND WORKBOOK, PUPIL TEXT AND TEST BOOKLET FOR GRADE 1.) ILLUSTRATED BY MONROE EISENBERG.
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-E)
QT_ (1)

BQ-2262 TI_ READING SKILLS FIVE FOR USE WITH A WORLD OF SURPRISES
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (WORKBOOK)
AU_ EARLY, MARGARET AND OTHERS
CD_ 1970
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ (0-15-332465-1)
SI_ (0-15-332465-1)
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 127P. (132P.)
PR_ ($1.20)
SN_ (COORDINATED WITH DUPLICATING MASTERS V, TEACHER'S EDITION OF READER 2-1 AND WORKBOOK, PUPIL TEXT AND BOOKLET FOR GRADE 2.) ILLUSTRATED BY MONROE EISENBERG.
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-G)
QT_ (1)

BQ-2266 TI_ READING SKILLS SIX FOR USE WITH GOING PLACES, SEEING PEOPLE
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (WORKBOOK)
AU_ EARLY, MARGARET AND OTHERS.
CD_ 1970
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ 0-15-332490-2
SI_ 0-15-332490-2
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 127P. (132P.)
PR_ ($1.20)
SN_ (COORDINATED WITH DUPLICATING MASTERS VI, TEACHER'S EDITION OF READER 2-2 AND WORKBOOK, PUPIL TEXT AND BOOKLET FOR GRADE 2.) ILLUSTRATED BY MONROE EISENBERG.
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-H)
QT_ (1)

BQ-2268 TI_RING AROUND THE WORLD
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (BOOK)
AU_ EARLY, MARGARET AND COOPER, ELIZABETH K.
CD_ 1970
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ 0-15-332565-8
SI_ 0-15-332565-8
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 296P. (306P.)
PR_ ($3.30)
SN_ (COORDINATED WITH DUPLICATING MASTERS VIII, TEACHER'S EDITION OF READER 3-2 AND WORKBOOK, READING SKILLS EIGHT, AND TEST BOOKLET FOR GRADE 3.) ARTISTS: RAYMOND AMEIJIDE, DAVE BLOSSOM, WARD BRACKETT, ARTHUR CHITOURAS, JOHN DALY, MATT DELFINO, JR., GEORGE GUZZI, JACK HERN, JOHN JONES, PETER LANDA, CHARLES SOVEK, BEN STAHL, AND SUSAN SWAN. BOUND WITH TEXT IS BOOK, THE HORSE WHO HAD HIS PICTURE IN THE PAPER BY PHYLISS MCGINLEY AND PICTURES BY HELEN STONE.
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-J)
QT_ (1)

BQ-2259 TI_ SUN AND SHADOW
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (BOOK)
AU_ COOPER, ELIZABETH K.
CD_ 1970
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ 0-15-332380-9
SI_ 0-15-332380-9
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 160P.
PR_ ($2.55)
SN_ (COORDINATED WITH DUPLICATING MASTERS III, TEACHER'S EDITION OF PRIMER AND WORKBOOK, AND READING SKILLS THREE AND TEST BOOKLET FOR GRADE 1.) ARTISTS: BETTY MAXEY, LORING EUTEMEY, JOHN BURNINGHAM. ORIN KINCADE, AND JAN BALET.
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-E)
QT_ (1)

BQ-2254 TI_ TEACHER'S EDITION FOR LOOK, LISTEN, AND LEARN
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (BOOK)
AU_ BURKE, MARGARET B.
CD_ 1971
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ 0-15-332332-9
SI_ 0-15-332332-9
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 131P. (145P.)
PR_ ($3.45)
SN_ (COORDINATED WITH PUPIL TEXT.)
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-A)
QT_ (1)

BQ-2261 TI_ TEACHER'S EDITION FOR SUN AND SHADOW AND READING SKILLS THREE
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (BOOK)
AU_ EARLY, MARGARET AND OTHERS
CD_ 1970
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ 0-15-332392-2
SI_ 0-15-332392-2
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 240P. (250P.)
PR_ ($3.60)
SN_ (COORDINATED WITH DUPLICATING MASTERS III, PUPIL TEXT, READING SKILLS THREE, AND TEST BOOKLET FOR GRADE 1.)
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-E)
QT_ (1)

BQ-2255 TI_ TEACHER'S EDITION FOR SUN UP AND READING SKILLS ONE
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (BOOK)
AU_ EARLY, MARGARET AND OTHERS
CD_ 1970
SP_ HARCOURT BRACE JOVANOVICH, INC. NEW YORK, N.Y.
SB_ 0-15-332347-7
SI_ 0-15-332347-7
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 176P. (186P.)
PR_ ($5.70)
SN_ (COORDINATED WITH DUPLICATING MASTERS I, PRIMARY READER-SUN UP AND READING SKILLS ONE WORKBOOK AND TEST BOOKLET FOR GRADE 1.)
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-B)
QT_ (1)

BQ-2263 TI_ TOGETHER WE GO
PN_ THE BOOKMARK READING PROGRAM - PRIMARY READERS
FT_ (BOOK)
AU_ COOPER, ELIZABETH K.
CD_ 1970
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ 0-15-332405-8
SI_ 0-15-332405-8
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 192P.
PR_ ($2.70)
SN_ (COORDINATED WITH DUPLICATING MASTERS IV, TEACHER'S EDITION OF FIRST READER AND WORKBOOK, READING SKILLS FOUR, AND TEST BOOKLET FOR GRADE 1.) ARTISTS: JOHN GRETZER, LYNN SWEAT, ALLAN MARDON WILSON MCLEAN, AND LORING EUTEMEY. BOUND WITH TEXT IS STORY, TOO MANY BOZOS BY LILIAN MOORE.
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-F)
QT_ (1)

BQ-2267 TI_ WIDENING CIRCLES
PN_ THE BOOKMARK READING PROGRAM - THE PRIMARY READERS
FT_ (BOOK)
AU_ EARLY, MARGARET AND OTHERS
CD_ 1970
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ 0-15-332540-2
SI_ 0-15-332540-2
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SD_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 288P.
PR_ ($3.30)
SN_ (COORDINATES WITH TEACHER'S EDITION AND DUPLICATING MASTERS VIII.)
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-I)
QT_ (1)

BQ-2264 TI_ A WORLD OF SURPRISES
PN_ THE HOLIDAY READING PROGRAM - PRIMARY READERS
FT_ (BOOK)
AU_ COOPER, ELIZABETH K.
CD_ 1970
SP_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SB_ 0-15-332460-0
SI_ 0-15-332460-0
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y.
SC_ HARCOURT BRACE JOVANOVICH, INC., NEW YORK, N.Y. SCHOOL DEPT.
PG_ 224P.
PR_ ($2.70)
SN_ (COORDINATED WITH DUPLICATING MASTERS V, TEACHER'S EDITION OF READER 2-1 AND WORKBOOK, READING SKILLS FIVE AND TEST BOOKLET FOR GRADE 2.) ARTISTS: TED LEWIN, DON ALMQUIST, TOM COOKE, LYNN SWEAT, MATT DELFINO, AND ERNEST CRICHLOW. BOUND WITH TEXT IS BOOK, TWO IS A TEAM BY LORRAINE AND JERROLD BEIN AND PICTURES BY ERNEST CRICHLOW.
SU_ HARCOURT BRACE JOVANOVICH, INC., 1973, P.5, SCHOOL DEPT. CATALOG.
RC_ (1-HARBRA-01-G)
QT_ (1)

BQ-1965 TI_ THE CHECKERED FLAG SERIES
FT_ (KIT)
AU_ BAMMAN, HENRY A. AND WHITEHEAD, ROBERT J.
SP_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ (NPI)
SN_ (SERIES DIVIDED INTO 2 READING KITS: KIT A, 00113, AND KIT B, 00114. EACH KIT CONTAINS 6 COPIES EACH OF 4 BOOKS - KIT A INCLUDES TITLES. WHEELS, 00101; RIDDLER, 00102; BEARCAT, 00103; SMASHUP, 00104; AND KIT B INCLUDES TITLES: SCRAMBLE, 00105; FLEA, 00106; GRAND PRIX, 00107; AND 500, 00108. TEACHER'S MANUAL 00112 INCLUDED WITH EACH KIT. KIT A COORDINATES WITH AUDIO-VISUAL KITS 00115, 00164, 00116. KIT B COORDINATES WITH AUDIO-VISUAL KITS 00130, 00165, OR 00131.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.22,24.
RC_ (1-FIEEDP-03)
QT_ (*)

BQ-1959 TI_ BEARCAT
PN_ THE CHECKERED FLAG SERIES - (CLASSROOM AUDIO-VISUAL KIT A)
FT_ (FILMSTRIP)
AU_ BAMMAN, HENRY A. AND WHITEHEAD, ROBERT J. - ADVISORS
CD_ 1968
SP_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SB_ 514-00127-5
SI_ (00127)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($9.60)
SN_ (AVAILABLE SINGLY OR IN KIT A, 00115, TEACHER'S GUIDE 00129 INCLUDED. COORDINATES WITH CHECKERED FLAG SERIES CLASSROOM READING KIT A, 00113. MUST BE COORDINATED WITH RECORD, 00124, CASSETTE, 00156, OR TAPE, 00119. FROM BOOK, BEARCAT, 00103, BY BAMMAN AND WHITEHEAD, ILLUSTRATED BY JAMES ANDREWS.) CARS COURTESY HARRAH'S AUTOMOBILE COLLECTION.
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.24.
RC_ (1-FIEEDP-01-C)
QT_ (2)

BQ-1955 TI_ BEARCAT
PN_ THE CHECKERED FLAG SERIES - (CLASSROOM AUDIO-VISUAL KIT A)
FT_ (RECORD)
AU_ KNAPP, DON - NARRATOR
CD_ 1968
SP_ STUDIO 16, INC., SAN FRANCISCO, CALIF.
SB_ 514-00123-2
SI_ (00123)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($4.20)
SN_ LP, 33-1/3 RPM. ONE SIDE MANUAL ADVANCE - AUTOMATIC ON REVERSE. (AVAILABLE IN KIT A, 00115, 00164, OR 00116, OR SINGLY, COORDINATED WITH TEACHER'S GUIDE A, 00129, AND SYNCHRONIZED WITH FILMSTRIP, 00127. NARRATION FROM BOOK BEARCAT, 00103 BY HENRY A. BAMMAN AND ROBERT J. WHITEHEAD. FOR USE WITH CHECKERED FLAG READING KIT A, 00113. ALSO AVAILABLE IN CASSETTE, 00156, OR TAPE, 00119.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.2[illegible],24.
RC_ (1-FIEEDP-01-C)
QT_ (2)

BQ-0234 TI_ BEARCAT
PN_ (THE CHECKERED FLAG SERIES - CLASSROOM AUDIO-VISUAL KIT A)
FT_ (REEL TAPE)
AU_ GOMAN, RAY K. - NARRATOR
CD_ 1968
SP_ STUDIO 16, INC., SAN FRANCISCO, CALIF.
SB_ 514-00199-4
SI_ (00119)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($10.50)
SN_ 2-TRACK TAPE, 3-3/4 IPS, MONAURAL. (COORDINATED WITH TEACHER'S GUIDE A, 00129. AND FILMSTRIP OF SAME TITLE, 00127. ALSO AVAILABLE IN CASSETTE, 00156, AND RECORD, 00123. ITEM COORDINATES WITH TEXT OF BOOK, 00103, BY HENRY A. BAMMAN AND ROBERT J. WHITEHEAD. AVAILABLE SINGLY OR IN KIT, 00115.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.24.
RC_ (1-FIEEDP-01)
QT_ (2)

BQ-1958 TI_ RIDDLER
PN_ THE CHECKERED FLAG SERIES - (CLASSROOM AUDIO-VISUAL KIT A)
FT_ (FILMSTRIP)
AU_ BAMMAN, HENRY A. AND WHITEHEAD, ROBERT J. - ADVISORS
CD_ 1968
SP_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SB_ 514-00126-7
SI_ (00126)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($9.60)
SN_ (AVAILABLE SINGLY OR IN KIT A, 00115, TEACHER'S GUIDE 00129 INCLUDED. COORDINATES WITH CHECKERED FLAG SERIES CLASSROOM READING KIT A, 00113. MUST BE COORDINATED WITH RECORD, 00122, CASSETTE, 00155, OR TAPE, 00118. FROM BOOK, RIDDLER, 00102, BY BAMMAN AND WHITEHEAD, ILLUSTRATED BY JAMES ANDREWS.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.24.
RC_ (1-FIEEDP-01-B)
QT_ (2)

BQ-1954 TI_ RIDDLER
PN_ THE CHECKERED FLAG SERIES - (CLASSROOM AUDIO-VISUAL KIT A)
FT_ (RECORD)
AU_ KNAPP, DON - NARRATOR
CD_ 1968
SP_ STUDIO 16, INC., SAN FRANCISCO, CALIF.
SB_ 514-00122-4
SI_ (00122)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($4.20)
SN_ LP, 33-1/3 RPM. ONE SIDE MANUAL ADVANCE - AUTOMATIC ON REVERSE. (AVAILABLE IN KIT A, 00115, 00164, OR 00116, OR SINGLY. COORDINATED WITH TEACHER'S GUIDE A, 00129, AND SYNCHRONIZED WITH FILMSTRIP, 00126. NARRATION FROM BOOK, RIDDLER, 00102, BY HENRY A. BAMMAN AND ROBERT J. WHITEHEAD. FOR USE WITH CHECKERED FLAG READING KIT A, 00113. ALSO AVAILABLE IN CASSETTE, 00115, OR TAPE, 00118.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.22,24.
RC_ (1-FIEEDP-01-B)
QT_ (2)

BQ-0232 TI_ RIDDLER
PN_ (THE CHECKERED FLAG SERIES - CLASSROOM AUDIO-VISUAL KIT A)
FT_ (REEL TAPE)
AU_ GOMAN, RAY K. - NARRATOR
CD_ 1968
SP_ STUDIO 16, INC., SAN FRANCISCO, CALIF.
SB_ 514-00118-6
SI_ (00118)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($10.50)
SN_ 2-TRACK TAPE, 3-3/4 IPS, MONAURAL. (COORDINATES WITH TEACHER'S GUIDE A, 00129, AND FILMSTRIP OF SAME TITLE, 00126. ALSO AVAILABLE IN CASSETTE, 00155, AND RECORD, 00122, ITEM COORDINATES WITH TEXT OF BOOK, 00102, BY HENRY A. BAMMAN AND ROBERT J. WHITEHEAD. AVAILABLE SINGLY OR IN KIT, 00115.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.24.
RC_ (1-FIEEDP-01)
QT_ (2)

BQ-1960 TI_ SMASHUP
PN_ THE CHECKERED FLAG SERIES - (CLASSROOM AUDIO-VISUAL KIT A)
FT_ (FILMSTRIP)
AU_ BAMMAN, HENRY A. AND WHITEHEAD, ROBERT J. - ADVISORS
CD_ 1968
SP_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SB_ 514-00128-3
SI_ (00128)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($9.60)
SN_ (AVAILABLE SINGLY OR IN KIT A, 00115, TEACHER'S GUIDE 00129 INCLUDED. COORDINATES WITH CHECKERED FLAG SERIES CLASSROOM READING KIT A, 00113, MUST BE COORDINATED WITH RECORD, 00124, CASSETTE, 00157, OR TAPE, 00120. FROM BOOK, SMASHUP, 00104, BY BAMMAN AND WHITEHEAD, ILLUSTRATED BY JAMES ANDREWS.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.24.
RC_ (1-FIEEDP-01-D)
QT_ (2)

BQ-1956 TI_ SMASHUP
PN_ THE CHECKERED FLAG SERIES - (CLASSROOM AUDIO-VISUAL KIT A)
FT_ (RECORD)
AU_ KNAPP, DON - NARRATOR
CD_ 1968
SP_ STUDIO 16, INC., SAN FRANCISCO, CALIF.
SB_ 514-00124-0
SI_ (00124)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($4.20)
SN_ LP, 33-1/3 RPM. ONE SIDE MANUAL ADVANCE - AUTOMATIC ON REVERSE. (AVAILABLE IN KIT A, 00115, 00164, OR 00116, OR SINGLY. COORDINATED WITH TEACHER'S GUIDE A, 00129, AND SYNCHRONIZED WITH FILMSTRIP, 00128. NARRATION FROM BOOK, SMASH UP, 00104, BY HENRY A. BAMMAN AND ROBERT J. WHITEHEAD. FOR USE WITH CHECKERED FLAG READING KIT A, 00113. ALSO AVAILABLE IN CASSETTE, 00157, OR TAPE, 00120.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.22,24.
RC_ (1-FIEEDP-01-D)
QT_ (2)

BQ-0230 TI_ SMASHUP
PN_ (THE CHECKERED FLAG SERIES - CLASSROOM AUDIO-VISUAL KIT A)
FT_ (REEL TAPE)
AU_ GOMAN, RAY K. - NARRATOR
CD_ 1968
SP_ STUDIO 16, INC., SAN FRANCISCO, CALIF.
SB_ 514-00120-8
SI_ (00120)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($10.50)
SN_ 2-TRACK TAPE, 3-3/4 IPS, MONAURAL. (COORDINATED WITH TEACHER'S GUIDE A, 00129, AND FILMSTRIP OR SAME TITLE, 00128. ALSO AVAILABLE IN CASSETTE, 00157, AND RECORD, 00124. ITEM COORDINATES WITH TEXT OF BOOK, 00104, BY HENRY A. BAMMAN AND ROBERT J. WHITEHEAD. AVAILABLE SINGLY OR IN KIT, 00115.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.24.
RC_ (1-FIEEDP-01)
QT_ (2)

BQ-1957 TI_ WHEELS
PN_ THE CHECKERED FLAG SERIES - (CLASSROOM AUDIO-VISUAL KIT A)
FT_ (FILMSTRIP)
AU_ BAMMAN, HENRY A. AND WHITEHEAD, ROBERT J. - ADVISORS
CD_ 1968
SP_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SB_ 514-00125-9
SI_ (00125)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($9.60)
SN_ (AVAILABLE SINGLY OR IN KIT A, 00115, TEACHER'S GUIDE 00129 INCLUDED. COORDINATES WITH CHECKERED FLAG SERIES CLASSROOM READING KIT A, 00113, MUST BE COORDINATED WITH RECORD, 00121, CASSETTE, 00154, OR TAPE, 00117. FROM BOOK, WHEELS, 00101, BY BAMMAN AND WHITEHEAD, ILLUSTRATED BY JAMES ANDREWS.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.24.
RC_ (1-FIEEDP-01-A)
QT_ (2)

BQ-1953 TI_ WHEELS
PN_ THE CHECKERED FLAG SERIES - (CLASSROOM AUDIO-VISUAL KIT A)
FT_ (RECORD)
AU_ KNAPP, DON - NARRATOR
CD_ 1968
SP_ STUDIO 16, INC., SAN FRANCISCO, CALIF.
SB_ 514-00121-6
SI_ (00121)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($4.20)
SN_ LP, 33-1/3 RPM. ONE SIDE MANUAL ADVANCE - AUTOMATIC ON REVERSE. (AVAILABLE IN KIT A, 00115, 00164, OR 00116, OR SINGLY. COORDINATED WITH TEACHER'S GUIDE A, 00129, AND SYNCHRONIZED WITH FILMSTRIP, 00125. NARRATION FROM BOOK, WHEELS, 00101, BY HENRY A. BAMMAN AND ROBERT J. WHITEHEAD. FOR USE WITH CHECKERED FLAG READING KIT A, 00113. ALSO AVAILABLE IN CASSETTE, 00154, OR TAPE, 00117.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.22,24.
RC_ (1-FIEEDP_01-A)
QT_ (2)

BQ-0227 TI_ WHEELS
PN_ (THE CHECKERED FLAG SERIES - CLASSROOM AUDIO-VISUAL KIT A)
FT_ (REEL TAPE)
AU_ GOMAN, RAY K. - NARRATOR
CD_ 1968
SP_ STUDIO 16, INC., SAN FRANCISCO, CALIF.
SB_ 514-00117-1
SI_ (00117)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($10.50)
SN_ 2-TRACK TAPE, 3-3/4 IPS, MONAURAL. (COORDINATED WITH TEACHER'S GUIDE A, 00129, AND FILMSTRIP OF SAME TITLE, 00125. ALSO AVAILABLE IN CASSETTE, 00154, AND RECORD, 00121. ITEM COORDINATES WITH TEXT OF BOOK, 00101, BY HENRY A. BAMMAN AND ROBERT J. WHITEHEAD. AVAILABLE SINGLY OR IN KIT, 00115.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.24.
RC_ (1-FIEEDP-01)
QT_ (2)

BQ-1966 TI_ CHECKERED FLAG CLASSROOM READING KIT - (KIT A)
PN_ THE CHECKERED FLAG SERIES
FT_ (BOOKS SETS)
AU_ BAMMAN, HENRY A. AND WHITEHEAD, ROBERT J.
SP_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SB_ (514-00113-5)
SI_ (00113)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PR_ ($54.00)
SN_ (CONTAINS TEACHER'S MANUAL 00112, AND 6 COPIES EACH OF 4 BOOKS: WHEELS, 00101; RIDDLER, 00102; BEARCAT, 00103; AND SMASHUP, 00104. COORDINATED WITH CLASSROOM AUDIO-VISUAL KIT A, 00115 WITH TAPES; 00164 WITH CASSETTES; OR 00116 WITHOUT TAPES OR CASSETTES.) ALL BOOKS ILLUSTRATED BY JAMES ANDREWS.
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.22,24.
RC_ (1-FIEEDP-03)
QT_ (1)

BQ-0233 TI_ BEARCAT
PN_ THE CHECKERED FLAG SERIES - (CLASSROOM READING KIT A)
FT_ (BOOK)
AU_ BAMMAN, HENRY A. AND WHITEHEAD, ROBERT J.
CD_ 1967
SP_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SB_ 514-00103-8
SI_ (00103)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PG_ 89P. (96P.)
PR_ ($2.25)
SN_ ILLUSTRATED BY JAMES ANDREWS. (AVAILABLE IN CHECKERED FLAG KIT A, 00113; IN SET OF FIRST 4 TITLES, 00109; IN SET OF ALL 8 TITLES, 00111; OR SINGLY. COORDINATES WITH TEACHER'S GUIDE, 00112; WITH CASSETTE, 00156; FILMSTRIP, 00127; RECORD, 00123; AND TAPE, 00119.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.22, AND ORDER FORM, P.2.
RC_ (1-FIEEDP-03-C)
QT_ (2)

BQ-0231 TI_ RIDDLER
PN_ THE CHECKERED FLAG SERIES - (CLASSROOM READING KIT A)
FT_ (BOOK)
AU_ BAMMAN, HENRY A. AND WHITEHEAD, ROBERT J.
CD_ 1967
SP_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SB_ 514-00102-X
SI_ (00102)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PG_ 89P. (96P.)
PR_ ($2.25)
SN_ ILLUSTRATED BY JAMES ANDREWS. (AVAILABLE IN CHECKERED FLAG KIT A, 00113; IN SET OF FIRST 4 TITLES, 00109; IN SET OF ALL 8 TITLES, 00111; OR SINGLY. COORDINATES WITH TEACHER'S GUIDE, 00112; WITH CASSETTE, 00155; FILMSTRIP, 00126; RECORD, 00122; AND TAPE, 00118.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.22, AND ORDER FORM, P.2.
RC_ (1-FIEEDP-03-B)
QT_ (6)

BQ-0229 TI_ SMASHUP
PN_ THE CHECKERED FLAG SERIES - (CLASSROOM READING KIT A)
FT_ (BOOK)
AU_ BAMMAN, HENRY A. AND WHITEHEAD, ROBERT J.
CD_ 1967
SP_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SB_ 514-00104-6
SI_ (00104)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PG_ 89P. (94P.)
PR_ ($2.25)
SN_ ILLUSTRATED BY JAMES ANDREWS. (AVAILABLE IN CHECKERED FLAG KIT A, 00113; IN SET OF FIRST 4 TITLES, 00109; IN SET OF ALL 8 TITLES, 00111; OR SINGLY. COORDINATES WITH TEACHER'S GUIDE, 00112; WITH CASSETTE, 00157; FILMSTRIP, 00128; RECORD, 00124; AND TAPE, 00120.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.22, AND ORDER FORM, P.2.
RC_ (1-FIEEDP-03-D)
QT_ (6)

BQ-0228 TI_ WHEELS
PN_ THE CHECKERED FLAG SERIES - (CLASSROOM READING KIT A)
FT_ (BOOK)
AU_ BAMMAN, HENRY A. AND WHITEHEAD, ROBERT J.
CD_ 1967
SP_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
SB_ 514-00101-1
SI_ (00101)
SC_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF
SD_ FIELD EDUCATIONAL PUBLICATIONS, INC., PALO ALTO, CALIF.
PG_ 87P. (92P.)
PR_ ($2.25)
SN_ ILLUSTRATED BY JAMES ANDREWS. (AVAILABLE IN CHECKERED FLAG KIT A, 00113; IN SET OF FIRST 4 TITLES, 00109; IN SET OF ALL 8 TITLES, 00111; OR SINGLY. COORDINATES WITH TEACHER'S GUIDE, 00112; WITH CASSETTE, 00154; FILMSTRIP, 00125; RECORD, 00121; AND TAPE, 00117.)
SU_ FIELD EDUCATIONAL PUBLICATIONS, INC., 1972, P.22, AND ORDER FORM, P.2.
RC_ (1-FIEEDP-03-A)
QT_ (6)

BQ-3781 TI_ PHONICS WE USE LEARNING GAMES KIT
FT_ GAMES KIT
CD_ 1968
SP_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SI_ LC-352-700
SC_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SD_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
PR_ ($65.44)
SN_ (INCLUDES 10 GAMES - OLD ITCH; SPIN-A-SOUND; BINGOBANG; BLENDS RACE; DIGRAPH WHIRL; DIGRAPH HOPSCOTCH; VOWEL DOMINOES; SPIN HARD, SPIN SOFT; FULL HOUSE; SYLLABLE COUNT; AND 1 TEACHER'S MANUAL.) CONSULTANTS: ARTHUR W. HEILMAN, RUTH HELMKAMP, AILEEN E. THOMAS, AND CARMEN J. CARSELLO. (SOLD IN COMPLETE KIT ONLY.)
SU_ LYONS AND CARNAHAN, 1973, P.5.
RC_ (1-LYOANC-08)
QT_ (1)

BQ-3782 TI_ TEACHER'S MANUAL AND DIRECTIONS FOR PLAYING PHONICS WE USE LEARNING GAMES KIT
PN_ PHONICS WE USE LEARNING GAMES KIT
FT_ (BOOKLET)
CD_ 1968
SP_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SI_ LC-352-740
SC_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SD_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
PG_ 36P. (42P.)
PR_ (NPI)
SN_ (AVAILABLE ONLY IN LEARNING GAMES KIT, 352-700. COORDINATED WITH THE 20 GAMES IN KIT.) CONSULTANTS: ARTHUR W. HEILMAN, RUTH HELMKAMP, AILEEN E. THOMAS, CARMEN J. CARSELLO.
SU_ LYONS AND CARNAHAN, 1973, P.5
RC_ (1-LYOANC-08)
QT_ (2)

BQ-3783 TI_ OLD ITCH - MATCH AND SHOW; CONSONANT RUMMY - INITIAL CONSONANT SOUNDS
PN_ PHONICS WE USE LEARNING GAMES KIT - GAME 1
FT_ GAME
CD_ 1968
SP_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SC_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SD_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
PG_ (144P.)
PR_ (NPI)
SN_ (AVAILABLE ONLY IN LEARNING GAMES KIT, 352-700. 72 CARDS PLUS 4-PAGE DIRECTIONS. COORDINATED WITH TEACHER'S MANUAL, 352-740, INCLUDED IN KIT.)
SU_ LYONS AND CARNAHAN, 1973, P.5.
RC_ (1-LYOANC-08)
QT_ (1)

BQ-3784 TI_ SPIN-A-SOUND - INITIAL CONSONANT SOUNDS AND SYMBOL
PN_ PHONICS WE USE LEARNING GAMES KIT - GAME 2
FT_ GAME
CD_ 1968
SP_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SC_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SD_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
PR_ (NPI)
SN_ (AVAILABLE ONLY IN LEARNING GAMES KIT, 352-700. CONSISTS OF BLACK GAME BOARD, SPINNER, BOARD MARKERS, PLUS 4-PAGE DIRECTIONS. COORDINATED WITH TEACHER'S MANUAL, 352-740, INCLUDED IN KIT.)
SU_ LYONS AND CARNAHAN, 1973, P.5.
RC_ (1-LYOANC-08)
QT_ (1)

BQ-3785 TI_ BINGOBANG - FINAL CONSONANT SOUNDS AND SYMBOLS
PN_ PHONICS WE USE LEARNING GAMES KIT - GAME 3
FT_ GAME
CD_ 1968
SP_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SC_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SD_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
PR_ (NPI)
SN_ (AVAILABLE ONLY IN LEARNING GAMES KIT, 352-700. CONSISTS OF 8 GAME BOARDS, 36 CARDS, 128 OPAQUE MARKERS, AND 4-PAGE DIRECTIONS. COORDINATED WITH TEACHER'S MANUAL, 352-740, INCLUDED IN KIT.)
SU_ LYONS AND CARNAHAN, 1973, P.5.
RC_ (1-LYOANC-08)
QT_ (1)

BQ-3786 TI_ BLENDS RACE - INITIAL CONSONANT BLENDS AND SYMBOLS
PN_ PHONICS WE USE LEARNING GAMES KIT - GAME 4
FT_ GAME
CD_ 1968
SP_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SC_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SD_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
PR_ (NPI)
SN_ (AVAILABLE ONLY IN LEARNING GAMES KIT, 352-700. CONSISTS OF RED GAME BOARD, SPINNER, 8 MARKERS, AND 4-PAGE DIRECTIONS. COORDINATED WITH TEACHER'S MANUAL, 352-740, INCLUDED IN KIT.)
SU_ LYONS AND CARNAHAN, 1973, P.5.
RC_ (1-LYOANC-08)
QT_ (1)

BQ-3787 TI_ DIGRAPH WHIRL - INITIAL CONSONANT DIGRAPHS AND SYMBOLS
PN_ PHONICS WE USE LEARNING GAMES KIT - GAME 5
FT_ GAME
CD_ 1968
SP_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SC_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SD_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
PR_ (NPI)
SN_ (AVAILABLE ONLY IN LEARNING GAMES KIT, 352-700. CONSISTS OF 10 GAME BOARDS, SPINNER INDICATOR, 160 MARKERS, AND 4-PAGE DIRECTIONS. COORDINATED WITH TEACHER'S MANUAL, 352-740, INCLUDED IN KIT.)
SU_ LYONS AND CARNAHAN, 1973, P.5.
RC_ (1-LYOANC-08)
QT_ (1)

BQ-3788 TI_ DIGRAPH HOPSCOTCH - INITIAL AND FINAL CONSONANT DIGRAPHS AND SYMBOLS
PN_ PHONICS WE USE LEARNING GAMES KIT - GAME 6
FT_ GAME
CD_ 1968
SP_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SC_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SD_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
PR_ (NPI)
SN_ (AVAILABLE ONLY IN LEARNING GAMES KIT, 352-700. CONSISTS OF BLUE GAME BOARD, DIE, 8 MARKERS, AND 4-PAGE DIRECTIONS. COORDINATED WITH TEACHER'S MANUAL, 352-740, INCLUDED IN KIT.)
SU_ LYONS AND CARNAHAN, 1973, P.5.
RC_ (1-LYOANC-08)
QT_ (1)

BQ-3789 TI_ VOWEL DOMINOES - LONG AND SHORT VOWELS AND SYMBOLS
PN_ PHONICS WE USE LEARNING GAMES KIT - GAME 7
FT_ GAME
CD_ 1968
SP_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SC_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SD_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
PG_ (60P.)
PR_ (NPI)
SN_ (AVAILABLE ONLY IN LEARNING GAMES KIT, 352-700. 60 PICTURE-CARD DOMINOES AND 4-PAGE DIRECTIONS. COORDINATED WITH TEACHER'S MANUAL, 352-740, INCLUDED IN KIT.)
SU_ LYONS AND CARNAHAN, 1973, P.5.
RC_ (1-LYOANC-08)
QT_ (1)

BQ-3790 TI_ SPIN HARD, SPIN SOFT - HARD AND SOFT SOUNDS OF C AND G
PN_ PHONICS WE USE LEARNING GAMES KIT - GAME 8
FT_ GAME
CD_ 1968
SP_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SC_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SD_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
PR_ (NPI)
SN_ (AVAILABLE ONLY IN LEARNING GAMES KIT, 352-700. CONSISTS OF 8 GAME BOARDS, SPINNER, 128 MARKERS, AND 4-PAGE DIRECTIONS. COORDINATED WITH TEACHER'S MANUAL, 352-742, INCLUDED IN KIT.)
RC_ (1-LYOANC-08)
QT_ (1)

BQ-3791 TI_ FULL HOUSE - VOWELS, VOWEL DIGRAPHS, AND DIPTHONGS
PN_ PHONICS WE USE LEARNING GAMES KIT - GAME 9
FT_ GAME
CD_ 1968
SP_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SC_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SD_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
PR_ (NPI)
SN_ (AVAILABLE ONLY IN LEARNING GAMES KIT, 352-700. CONSISTS OF 8 GAME BOARDS, 96 PICTURE CARDS, AND 4-PAGE DIRECTIONS. COORDINATED WITH TEACHER'S MANUAL, 352-740, INCLUDED IN KIT.)
SU_ LYONS AND CARNAHAN, 1973, P.5.
RC_ (1-LYOANC-08)
QT_ (1)

BQ-3792 TI_ SYLLABLE COUNT - SYLLABICATION AND ACCENT
PN_ PHONICS WE USE LEARNING GAMES KIT - GAME 10
FT_ GAME
CD_ 1968
SP_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SC_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
SD_ LYONS AND CARNAHAN, INC., CHICAGO, ILL.
PR_ (NPI)
SN_ (AVAILABLE ONLY IN LEARNING GAMES KIT, 352-700. CONSISTS OF 8 GAME BOARDS, SPINNER, 128 MARKERS, AND 4-PAGE DIRECTIONS. COORDINATED WITH TEACHER'S MANUAL, 352-740, INCLUDED IN KIT.)
SU_ LYONS AND CARNAHAN, 1973, P.5.
RC_ (1-LYOANC-08)
QT_ (1)

BQ-3890 TI_ THE TURNER-LIVINGSTON COMMUNICATION SERIES
FT_ (WORKBOOKS SET)
AU_ TURNER, RICHARD H.
CH_ TURNER, RICHARD H.
SD_ FOLLETT PUBLISHING CO., CHICAGO, ILL. CUSTOMER SERVICE CENTER
PR_ (NPI)
SN_ (6 WORKBOOKS, 0552, 0553, 0554, 0555, 0556, 0558, AND TEACHER'S GUIDE, 0559. RESPECTIVE TITLES: THE TELEVISION YOU WATCH, THE PHONE CALLS YOU MAKE, THE NEWSPAPERS YOU READ, THE MOVIES YOU SEE, THE LETTERS YOU WRITE, AND THE LANGUAGE YOU SPEAK. EACH AVAILABLE SINGLY.)
SU_ FOLLETT INSTRUCTIONAL MATERIALS, 1972-73, P.40.
RC_ (3-FOLPUC-01)
QT_ (*)

BQ-3894 TI_ THE LANGUAGE YOU SPEAK
PN_ THE TURNER-LIVINGSTON COMMUNICATION SERIES
FT_ (WORKBOOK)
AU_ TURNER, RICHARD H.
CD_ 1965
SP_ FOLLETT PUBLISHING CO., CHICAGO, ILL.
SI_ 0558
CH_ TURNER, RICHARD H.
SD_ FOLLETT PUBLISHING CO., CHICAGO, ILL. CUSTOMER SERVICE CENTER
PG_ 48P.
PR_ ($1.16)
SN_ (COORDINATES WITH TEACHER'S GUIDE, 0559, RELATED TO WORKBOOKS 0552, 0553, 0554, 0555, 0556.)
SU_ FOLLETT INSTRUCTIONAL MATERIALS, 1972-73, P.40.
RC_ (3-FOLPUC-01-D)
QT_ (5)

BQ-3893 TI_ THE MOVIES YOU SEE
PN_ THE TURNER-LIVINGSTON COMMUNICATION SERIES
FT_ (WORKBOOK)
AU_ TURNER, RICHARD H.
CD_ 1966
SP_ FOLLETT PUBLISHING CO., CHICAGO, ILL.
SI_ 0555
CH_ TURNER, RICHARD H.
SD_ FOLLETT PUBLISHING CO., CHICAGO, ILL. CUSTOMER SERVICE CENTER
PG_ 48P.
PR_ ($1.16)
SN_ (COORDINATES WITH TEACHER'S GUIDE, 0559. RELATED TO WORKBOOKS 0552, 0553, 0554, 0556, 0558.)
SU_ FOLLETT INSTRUCTIONAL MATERIALS, 1972-73, P.40.
RC_ (3-FOLPUC-01-D)
QT_ (5)

NATIONAL REGIONAL RESOURCE CENTER OF PENNSYLVANIA

SER-LAR SYSTEM
LEARNING OBJECTIVE REPORTS

Report Number C-1a - Learning Objectives Master File

The data bank of the NRRC/P contains a Master File of learning objectives. The objectives are collected from various commercial and non-commercial sources, e.g.:

Behavioral Characteristic Progression - Santa Cruz County Office of Education, Santa Cruz, Calif.

Commonwealth Plan for the Education and Training of Mentally Retarded Children - Pennsylvania Department of Education

Curriculum Guide for Trainable Mentally Retarded - Pennsylvania Department of Education

Instructional Objective Exchange - UCLA Center for the Study of Evaluation

SRA Reading - Diagnosis Level "A"
SRA Math - Diagnosis Level "A"
SRA Math - Diagnosis Level "B" - Science Research Associates

Health Elementary Mathematics - D.C. Heath & Company

Individual Achievement Monitoring System - Harcourt, Brace, and Jovanovich

Teacher Written Objectives - Field Personnel

Each learning objective from the above (and others if necessary) will be entered onto computer tape as follows:

ACCESSION NUMBER (AC_) - a five digit accession number assigned by NRRC/P

LEARNING OBJECTIVE (LO_) - the statement of the learning objective from the source

ABBREVIATED OBJECTIVE (AO_) - an abbreviated version of the learning objective statement

SOURCE(SO_) - a credit to the author or source of the objective

MARS DESCRIPTOR (MA_) - a key-word content descriptor

A sample of the above:

AC_ 00404
LO_ The student will be able to identify like and different initial sounds and discriminate between initial sounds.
AO_ Identify like/different sounds
SO_ Instructional Objective Exchange (IOX)
MA_ D2-04 Initial sounds

NATIONAL REGIONAL RESOURCE CENTER OF PENNSYLVANIA

SER-LAR SYSTEM
LEARNING OBJECTIVE REPORTS

Report Number C-1b - Learning Objectives Index

To access the previous report, the learning objectives are sorted by the content descriptor (MA_), thereby listing the accession numbers (AC_) and the abbreviated objective (AO_) as well as the source of the objective (SO_). Users of the system will then secure objectives through the content descriptors. For example:

MA_ D2-04
Initial sounds

AC_ 00404
AO_ Identify like/different initial sounds
SO_ Instructional Objective Exchange

AC_ 00405
AO_ State different initial sound from given
SO_ Instructional Objective Exchange

Level I. IDENTIFICATION AND CLASSIFICATION

Part C. The Media Analysis [illegible] Retrieval System (MARS): A Specific Pro[illegible]r Classification of Information [illegible]ctional Materials and Media

THE MEDIA ANALYSIS AND RETRIEVAL SYSTEM (MARS): A SPECIFIC PROCEDURE FOR CLASSIFICATION OF INFORMATION ON INSTRUCTIONAL MATERIALS AND MEDIA

Carolyn R. Rude
Midwestern Educational Resource Center
for the Handicapped
Coralville, Iowa

This paper describes one part of the Media Analysis and Retrieval System (MARS): the analysis of instructional materials and media. MARS was developed in response to needs of educators who are cooperating with the model development efforts of the Midwestern Educational Resource Center, Coralville, Iowa, one of six Educational Resource Centers in the United States.

Rationale

Learners

The main purpose of the educational process is to facilitate change in learners. Instructional materials and media provide one means of facilitating this change. Each learner is different and unique in terms of strengths and weaknesses in skills and abilities, in learning modes and styles. Each learner then should logically be taught what he/she needs to know (in the context of the educational system) using those resources which are most appropriate to his/her learning patterns.

Educational systems generate specific objectives which are analyzed for precise learning steps requiring choice of methods and materials which are appropriate for any given learning step. Only those which are appropriate for a given unique learner should be selected (McIntyre, 1970). This is the learner's need.

Teachers

Assuming the teacher is aware of the instructional steps in the learner's learning patterns, she/he must make the decision of what educational media resources to use by matching the needs of the learner with the characteristics of the resource.

The large number of educational materials available from publishers, at multicounty and regional level Instructional Materials Centers, and in the schools, makes it virtually impossible for a

teacher to merely go to a catalogue, a list, or a shelf and select at random a specific resource to match a learner's need. Making the choice among available methods and materials is much easier if those materials are already keyed (analyze-retrieve) to the learning steps (McIntyre, 1970).

The teacher needs training and immediately available information in order to select educational media resources which are available to her to match a learner objective and learner, teacher and environmental criterion in order to help effect behavioral change in the learner.

Other Educational Personnel

Other educational personnel have interactions with the teacher and learner. They work with the unique needs of the individual learner in his school setting and should be aware of his/her need for educational media resources which match his/her learning patterns.

The building and district administration and the person in charge of the school library/learning center/media center could profit from information about instructional materials and media which match specific learning steps. It would aid them in selection and purchasing and in guiding teachers in selection and usage. In recent years schools have acquired through NDEA and other funds, "half price" equipment and media. "So we have acquired lots of gadgets, even though we don't always know what to do with them" (Banathy, 1968).

Training analysis of educational materials and media makes the job of selection and use easier, whether at the teacher-child level, the regular and special education ancillary personnel-teacher level and/or the administrator-publishing company level. Having a media information system on available resources also helps in determining the other types of resources which are needed.

Inventory and analysis can take place at the building, district, intermediate, state and regional levels. The district and/or multicounty level Instructional Materials Centers could view the pattern of types of holdings in the schools and plan purchases to avoid low priority areas and to complement and supplement high priority and heavily used curriculum areas.

Educational materials and media should be selected because they fit well into the child's pattern of learning. Purchase should be justified in terms of evaluated cost/effectiveness. Educational materials and media at all levels of availability should be used to their best advantage. This is the need of the educational personnel.

Midwestern Educational Resource Center

Through the process of developing and diffusing the Educational Resource Strategist model (an inservice teacher trainer on diagnostic prescriptive processes) on a regional basis, the Midwestern Educational Resource Center (MERC) defined the parameters for a specific media analysis and retrieval system to meet the previously stated needs and problems. Local building and back-up level resources had to be available to support the Strategist's role of training classroom teachers to identify, diagnose, prescribe and deliver educational treatment for the learning problems of those students with intellectual, emotional and physical disabilities.

The Strategist model is a facilitator for such current educational trends as individualizing instruction for handicapped learners, mainstreaming special education students, diagnostic prescriptive teaching, parent volunteers, etc. MARS was designed to support any of these types of programs.

Regional Resource Centers

The development of a national information data bank was an objective of the Regional Resource Centers from their inception. Each Center has been developing its own versions of support system models to meet the objective of serving all handicapped children, ages three to 21. In each of these models, educational media resources are located and/or developed and used with handicapped learners.

The network of regional centers faced the problem of exchanging information in mutually compatible and acceptable ways. The Midwestern Educational Resource Center, the Teaching Resource Center in New York and the National Regional Resource Center in Pennsylvania formed a working group to deal with this problem. These three Resource Centers identified the need to exchange and pool independently gathered information on objectives, descriptors, materials and instructional strategies to develop a data bank usable by all.

Survey of Systems

The state of the art was reviewed by the author to identify the existing methods, systems, ideas and actual working models which could be implemented within the parameters of the described problem. Appropriate products of the IMC Network were studied, articles read, bibliographies perused and products in the field reviewed. It was concluded that the most complete and suitable working product to meet the problem and available at the time was the Prescriptive Materials Retrieval System (PMRS) from Select Ed., Inc. Experience

with this system, however, had shown a number of limitations. The limitations of PMRS follow:

1. The descriptor list was too limited in some areas to fully match the learning problems diagnosed and treated in the diagnostic-prescriptive model used.

2. The types of resources included was too limited to give access to all the types of information needed and available.

3. There was no provision for user input of descriptors or analyses of media resources available at the user's location. These resources might be existing commercial materials, locally developed information, etc.

4. No training information was given on how to analyze resources for the system, nor on how to use and/or implement it at several back-up levels to deliver information.

5. No provision was seen for identification and inventory of available resources to give access to the location of resources at all levels.

6. The resources analyzed and made retrievable were not tailored to the title holdings of the building as inventoried. Users can't tell if the title is available and if so, where.

7. No systematic method of bibliographic identification of resources was made known to the users to assist them in matching their inventories with the information contained in the system.

8. The Analysis (DAS) format is not cleanly laid out to guide the user to discrete bits of information within the analysis. If the user doesn't know what information goes into the analysis it's hard to sort out and comprehend what is there. This relates to training.

9. The retrieval process is somewhat complex with several steps to be taken before the response is received. A direct response in one step would be more desirable. Often users are frustrated when the response gives no immediately usable information. This relates to inventory, location at levels of availability and delivery.

10. No provision was made for evaluating resources or adding evaluative information to the retrievable information.

11. The cost was and is prohibitive for use at the local level, which is, after all, the primary level of need and usage of this information. A system which is inexpensive, flexible and

adaptable is most desirable.

It was concluded then that no appropriate information system existed for the analysis of instructional materials and media to meet the needs of the children, parents and educators served.

Method

The Overall System Model

With the above mentioned problems, needs, users and objectives freshly in mind, a model was designed to work within the defined parameters and was based on the following assumptions:

1. All elementary school buildings have some type of instructional materials and media available to them for use in instruction. These resources are located at several different levels of availability.

2. The types of resources used for instructional purposes include diagnostic tests and inventories; child-use commercial and original educational materials; teacher-use community and media resources; prescriptions, activities, methods, ideas.

3. In order for teachers, administrators and other educational personnel to plan for effective and efficient use of all available educational media resources they must know several things:

   a. What and where these resources are located (inventory).
   b. What learning objectives these resources can be used to meet (analysis, retrieval).
   c. How effective are they in meeting these objectives (evaluation).

The System Description

MARS is a method for providing training and delivery of information on inventory, analysis, retrieval and evaluation of existing educational media resources at the local, elementary building level.

Inventory is a listing of media resources existing at one of the levels which have been identified and located. Analysis is a specific description of an educational resource. The purpose of training on the analysis component is to give teachers criteria and structure concerning what to look at in a resource and how to look at it. Following this training process, formalized written analyses can be produced on educational media resources. Retrieval is a method of finding information on educational media resources which meet specific criteria. The written analyses are the content of the retrieval

process. Evaluation is the subjective statement by a person who has used a media resource, pertaining to its effectiveness in meeting a stated learning objective.

MARS can be used to train teachers in the basic processes of describing, selecting and rating for effectiveness the media resources they use for the ultimate purpose of enhancing their ability to diagnose and treat the educational problems of children in their classrooms. It also serves as a tool to assist in selecting and locating media resources which are available in the building and at back-up levels, and which can be used to meet specific learning objectives. MARS can be used in media centers at district, intermediate, state and regional levels, but is primarily intended for local building use because of the physical limitations of the keysort card retrieval format now used. However, the basic processes and information developed for the building level could be used at other levels with different types of retrieval tools, notably the computer.

Definitions

Educational Media Resources are the tools which teachers can use to communicate with learners, which are intermediary in getting across an idea. The following is a listing of those types of educational media resources included in MARS.

1. Diagnostic Test or Inventory
   Basic skill assessment tools for use by strategists and teachers.

2. Educational Materials
   Instructional materials for use by students with or without teachers' help.

   a. Commercial materials in Media Centers and in rooms
   b. Teacher made materials

3. Teacher Resources

   a. Media - commercial or original resources for use by teachers to develop or supplement instruction. They may suggest ways to collect, utilize or adapt and redesign new or already existing types of hardware and software.
   b. Community - people or places who could be called upon by the teacher for instructional purposes.

4. Strategy, Activity, Method, Idea

   a. Strategy - prescriptive plans written for specific

objectives from diagnosis by strategists and teachers, which incorporate methods and materials.

b. Activity, Method, Idea - things teachers know or use in their teaching. By sharing this information, it is available to stimulate the work of all teachers. The information may be used as written or adapted and further developed.

Method of Implementation

Several steps must be taken to implement the inventory and analysis phase of MARS in any center at any of the levels. First, given that the four types of educational media resources listed above exist at a location, the resources are then identified and inventoried. In a local building, this means listing all useful items in the media center, the teachers' rooms, etc. At other levels, locate and inventory resources as appropriate.

Ideally, inventories from the local level could be sent to the intermediate level to coordinate the media resources with the back-up system. As it operates in the Midwestern Educational Resource Center region, inventories are sent to MERC for entry in an Inventory Cross-Reference File. This file identifies resources at all locations where MARS is being implemented and will allow for cross-referencing of commonly held resources. MERC uses this file to identify those resources which have been analyzed and those which are yet to be analyzed at each individual location.

Second, given inventories of the four types of educational media resources, the resources are analyzed. Personnel from each participating location are trained on the analysis process. The MARS training materials give the procedure for describing a resource by a standard format (see Programmed Workbook for Analysis of Educational Media Resources, Appendix A) and list descriptor terms for recording specific information about a resource (see MARS Coding Guide, Appendix B). Personnel then complete analyses of their media resources as assigned from the Inventory File. Any given school or media center will not analyze all their own media resources as the task is shared with all other locations holding the same titles. Completed analyses are sent to MERC for quality check and preparation on retrieval cards. These two steps can result in steps 3 and 4 to completely implement MARS.

Third, given analyses of the four types of educational resources, MARS Retrieval Sets appropriate to the inventoried resources of each location are produced and made operational at each participating location. The Retrieval Set is received at those locations and set up for operation by the responsible personnel. Retrieval Sets for the schools contain cards only on resources existing at the location,

except when other alternatives have been arranged.

Personnel at each location use the MARS Retrieval Set to obtain information on educational media resources which match specific criterion by use of the descriptor terms listed in the Coding Guide, and pertaining to specific content, instructional and interest level, format, input, output, setting, type of resources, and location. They then select the most appropriate resource and locate it in the collection of educational media resources at that location. (See MARS Coding Guide, which contains all the retrievable terms, Appendix A; Programmed Workbook on Analysis of Educational Media Resources, Appendix B; Use of the Retrieval Set, Appendix C.)

Results

MARS is now being developed and implemented in local elementary school buildings and at district, intermediate and state levels in the six-state region served by MERC (Iowa, Missouri, Kansas, Nebraska, South Dakota and North Dakota). Other regional groups plus a university special education department are exploring or beginning the use of MARS during the coming school year. Computer formats are being developed to handle the multiplying amount of information on educational media resources in the system.

The three Regional Resource Centers mentioned previously are currently involved in pooling and exchanging specific information on objectives, materials and instructional strategies. These resources are being classified by the descriptors in the MARS Coding Guide, which reflects the merging of specific descriptors used by and applicable to the three centers.

The interest thus far shown by these educators would seem to indicate that MARS provides relevant information on instructional materials and media which has value to the consumer. This educational media analysis system is at least a beginning to the solution of the problem of supplying teachers with relevant information on materials.

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APPENDIX A

MARS Coding Guide

(This edition revised 7/25/73 to reflect collaboration of the Regional Resource Centers located in Iowa, Pennsylvania and New York)

MEDIA ANALYSIS AND RETRIEVAL SYSTEM

Coding Guide

INDEX

Page	
1	Introduction - Type of Item Descriptors
2	Major Area, Major Skill
3	Specific Descriptors
12	Instructional Level Descriptors - Interest Level Descriptors - Format Descriptors
13	Input Mode Descriptors - Output Mode Descriptors - Teacher/Learner Interaction Descriptors
14	Evaluation Descriptors - LERS Location - School Location
15	Specific Descriptors - Alphabetical Listing.

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Carolyn Rude, Technology Coordinator, 114 Second Avenue, Coralville, Iowa 52241; Phone (319) 351-4361; July 10, 1973.

MARS CODING GUIDE

INTRODUCTION

This Coding Guide contains the terms and code numbers to be used in analyzing and retrieving information on educational resources for the Media Analysis and Retrieval System.

When to use:

1. Analysis - use with Programmed Workbook for Analysis of Educational Resources and Analysis Sheet to assign terms and numbers.
2. Retrieval - use with a set of MARS Retrieval Cards to find terms and numbers.

TYPE OF ITEM DESCRIPTORS

D - Diagnostic Instruments

Basic skill assessment and/or screening tools for use by strategists and teachers.

M - Educational Materials

Instructional materials for use by students with or without teacher's help. Child use materials

a. Commercial
b. Teacher-made

T - Teacher Resources

a. Nonhuman - materials designed for use by teacher to supplement instruction. Teacher use materials
b. Human - community people with particular skills.

S - Strategies

a. Strategy - prescriptive instructional treatment plan based on specific objective with activities and assessment.
b. Activity, Method, Idea - which teachers know or used in their teaching and can share with other teachers.

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MAJOR AREA, MAJOR SKILL

Process

A. Sensory/Perceptual/Cognitive
1. Auditory
2. Visual
3. Gustatory
4. Olefactory
5. Tactile
6. Higher level cognitive functions

B. Affective
1. Self

C. Motor
* Not retrievable at this time.

Content - Academic

D. Reading
1. Readiness
2. Phonics
3. Comprehension
4. Structural Analysis
5. Vocabulary
6. Oral Reading
7. Literature
8. Programs

E. Language Arts/Use
1. English Grammar and Composition
2. Handwriting
3. Spelling
4. Speech and Language Development
5. Study Skills

F. Mathematics
1. Numeration
2. Addition
3. Subtraction
4. Multiplication
5. Division
6. Fractions/Decimals/Percent
7. Money/Time/Measurement/Geometry
8. Math - General

G. Social Studies
1. Economics
2. Geography
3. History
4. Political Science
5. Psychology and Philosophy
6. Sociology and Anthropology

H. Science
1. Earth Science
2. Life Science
3. Physical Science

I. Physical Education
1. Gross Motor
2. Fine Motor
3. Adaptive Physical Education
4. Recreation and Playground

J. Self Care
1. Toileting
2. Feeding/Eating
3. Drinking
4. Grooming
5. Oral Hygiene
6. Nasal Hygiene
7. Clothing Care
8. Safety
9. Dressing/Undressing

K. Prevocational/Vocational
1. Prevocational
2. Vocational

L. Fine Arts and Music
1. Fine Arts
2. Music

Content - Interpersonal

M. Self Knowledge/Social Interaction
1. Self Knowledge
2. Social Interaction

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SPECIFIC DESCRIPTORS

PROCESS

SENSORY/PERCEPTUAL/COGNITIVE

Auditory

A1-1. Auditory Acuity
A1-2. Auditory Attention Span
A1-3. Auditory Closure
A1-4. Auditory Constancy
A1-5. Auditory Depth Perception
A1-6. Auditory Discrimination
A1-7. Auditory Figure Ground
A1-8. Auditory Imagery
A1-9. Auditory Localization
A1-10. Auditory Motor Integration
A1-11. Auditory Perception (general term)
A1-12. Auditory Pitch/Volume/Tone
A1-13. Auditory Sequential Memory
A1-14. Auditory Visual Integration
A1-15. Auditory Vocal Integration

Visual

A2-1. Visual Acuity
A2-2. Visual Attention Span
Visual Auditory Integration (Use Auditory Visual Integration A1-14)
A2-3. Visual Closure
A2-4. Visual Constancy
A2-5. Visual Depth Perception
A2-6. Visual Discrimination
A2-7. Visual Figure Ground
A2-8. Visual Imagery
A2-9. Visual Motor Integration
A2-10. Visual Perception (general term)
A2-11. Visual Sequential Memory
A2-12. Visual Tracking/Pursuit/Fixation

Gustatory

A3-1. Gustatory Acuity
A3-2. Gustatory Closure
A3-3. Gustatory Discrimination
A3-4. Gustatory Figure Ground
A3-5. Gustatory Matching
A3-6. Gustatory Perception (general term)
A3-7. Gustatory Ranking
A3-8. Gustatory Sequential Memory

Olfactory

A4-1. Olfactory Acuity
A4-2. Olfactory Closure
A4-3. Olfactory Discrimination
A4-4. Olfactory Figure Ground
A4-5. Olfactory Matching
A4-6. Olfactory Perception (general term)
A4-7. Olfactory Ranking
A4-8. Olfactory Sequential Memory

Tactile

A5-1. Tactile Acuity
A5-2. Tactile Closure
A5-3. Tactile Discrimination
A5-4. Tactile Figure Ground
A5-5. Tactile Matching
A5-6. Tactile Perception (general term)
A5-7. Tactile Ranking
A5-8. Tactile Sequential Memory

Higher Level Cognitive Functions

A6-1. Abstract Reasoning
A6-2. Applied Relationship
A6-3. Comprehension (non-reading)
A6-4. Convergent Production
A6-5. Divergent Production
A6-6. Evaluation
A6-7. Problem Solving (non-math)
A6-8. Concept Formation
A6-9. Time Perspective

AFFECTIVE

Self

B1-1. Aggression
B1-2. Anxiety or Fear
B1-3. Attitudes
B1-4. Conflict
B1-5. Feeling (general term)
B1-6. Frustration
B1-7. Motivation
B1-8. Self Concept
B1-9. Withdrawn

MOTOR

* Use Specific Descriptors under I. Physical Education

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CONTENT - ACADEMIC

READING

Readiness

D1-1. Alphabet
D1-2. Classify /Categorize
D1-3. Color Concepts (see also Color Words D5-3)
D1-4. Copy /Trace
D1-5. Cut/ Paste/ Position
D1-6. Designs/ Patterns
D1-7. Directionality
D1-8. Dot Joining
D1-9. Eye Exercise
D1-10. Label/ Name
D1-11. Laterality
D1-12. Left to Right Progession
D1-13. Likeness and Difference
Listening Skills (See Auditory Area A1- for specific terms and comprehension A6-3)
D1-14. Match
D1-15. Part Whole Relationship
D1-16. Readiness Skills (general term)
D1-17. Relationship
Reversals (Use Visual Discrimination A2-6, Visual Motor Integration A2-9)
D1-18. Rhymes
Sequence (Use Auditory Sequential Memory A1-13, Visual Sequential Memory A2-11, Tactile Sequential Memory A5-8)
Shape (Use geometric shapes F7-3)
Size (Use inequalities F1-5)
D1-19. Spatial Orientation

Phonics

D2-1. Blend (Final)
D2-2. Blend (Initial)
D2-3. Consonant (Final)
D2-4. Consonant (Initial)
D2-5. Consonant (Medial)
D2-6. Consonant Variant
D2-7. Digraph (Consonant)
D2-8. Digraph (Vowel)
D2-9. Diphthong
D2-10. Hard/Soft Sound
D2-11. Phonics Rules
D2-12. Silent Letters
D2-13. Sound Blending
D2-14. Sound/Symbol Relationship
D2-15. Vowel (Initial)
D2-16. Vowel (Double)
D2-17. Vowel (Long)
D2-18. Vowel (Medial)
D2-19. Vowel (Short)
D2-20. Vowel Variant
D2-21. Blend
D2-22. Consonant
D2-23. Vowel

Comprehension

D3-1. Authorial Purpose
D3-2. Cause and Effect
D3-3. Character Assessment
D3-4. Comprehension (silent reading)
D3-5. Context clues
D3-6. Critical Reading/Fact vs. Fiction
D3-7. Drawing Conclusions/ Predicting Outcomes
D3-8. Following Directions
D3-9. Inference/ Implication
D3-10. Interpretation
D3-11. Locating Answers/ Reading for details
D3-12. Main Idea / Main Character
D3-13. Mood/Motives/Emotions
D3-14. Sequence of Events / Ideas
D3-15. Skimming/Scanning
D3-16. Specific Recall

Structural Analysis

D4-1. Accent
D4-2. Comparative
D4-3. Compound words
D4-4. Contractions
D4-5. Plurals
D4-6. Possessives
D4-7. Prefix
D4-8. Root word
D4-9. Suffixes
D4-10. Syllable
D4-11. Word Endings

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CONTENT - ACADEMIC

READING

Vocabulary Development

D5-1. Analogy
D5-2. Antonym/Opposite
D5-3. Color Words
D5-4. Descriptive Words
D5-5. Figurative Language
D5-6. Homonym
D5-7. Idiom
D5-8. Multiple Use Words/Word Connotation
D5-9. Position Words/ Abstract Words
D5-10. Protective Vocabulary
D5-11. Specialized Words
D5-12. Synonym
D5-13. Vocabulary/Sight Word
D5-14. Word Families/Patterns
D5-15. Word Meaning
D5-16. Word Origins
D5-17. Word Picture Matching
Number Words (Use F1-10 Number Words)

Oral/Silent Reading

D6-1. Cadence
D6-2. Comprehension (oral)
D6-3. Fluency
D6-4. Intonation
D6-5. Rate

Literature

D7-1. Adventure
D7-2. Animal
D7-3. Anthology
D7-4. Biography
D7-5. Classics
D7-6. Drama
D7-7. Fairy Tales
D7-8. Fantasy
D7-9. Folk Tales
D7-10. Foreign Theme
D7-11. Frontier Pioneer
D7-12. Humor
D7-13. Literature
D7-14. Mystery
D7-15. Mythology
D7-16. Nature
D7-17. Poetry
D7-18. Religion
D7-19. Riddles
D7-20. Rural Theme
D7-21. Science Fiction
D7-22. Science Related
D7-23. Social Studies Related
D7-24. Sports
D7-25. True Life
D7-26. Urban Theme

Programs

D8-1. Beginning Reading
D8-2. Developmental Reading
D8-3. Experimental/ New Alphabet/ Combined Approaches
D8-4. High Interest Low Vocabulary
D8-5. Independent Reading
D8-6. Language Arts Correlated
D8-7. Linguistic Approach
D8-8. Non-oral Reading Approach
D8-9. Phonemic Alphabet
D8-10. Remedial Reading

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CONTENT - ACADEMIC

LANGUAGE ARTS/USE

English Grammar and Composition

E1-1. Adjectives, Determiners
E1-2. Adverb
E1-3. Capitalization
E1-4. Composition
E1-5. Conjunction, Preposition, Interjection
E1-6. Creative Activities, Writing
E1-7. Dramatization
E1-8. Figures of Speech
E1-9. Grammar
E1-10. Noun
E1-11. Organization
E1-12. Outlining
E1-13. Paragraph Development
E1-14. Parts of Speech
E1-15. Phrase
E1-16. Predicate
E1-17. Pronoun
E1-18. Punctuation, Abbreviation
E1-19. Question
E1-20. Reports
E1-21. Sentence
E1-22. Sentence Structure, Building
E1-23. Subject
E1-24. Subject Verb Agreement
E1-25. Summary
E1-26. Syntax
E1-27. Verb

Handwriting

E2-1. Upper Case Letters
E2-2. Cursive Handwriting
E2-3. Left Handed Handwriting
E2-4. Letter Formation
E2-5. Lower Case Letters
E2-6. Manuscript Handwriting
E2-7. Spacing
E2-8. Transition Handwriting

Spelling

E3-1. Phonetic Spelling
E3-2. Spelling Demons
E3-3. Spelling Patterns(CVC,CE,CC,VVC,VY,CY)
E3-4. Spelling Rules
E3-5. Spelling Words

Speech and Language Development

E4-1. Breath Control
E4-2. Chew
E4-3. Clutter
E4-4. Echolalia
E4-5. Expressive Language
E4-6. Lip Control
E4-7. "Other Speech Therapy"
E4-8. Receptive Language
E4-9. Sign Language
E4-10. Saliva Control
E4-11. Sound Imitation
E4-12. Sound Making/Articulation
E4-13. Sound Substitution
E4-14. Stuttering
E4-15. Teeth Control
E4-16. Tongue Control

Study Skills

E5-1. Alphabetize
E5-2. Dictionary
Following Directions (Use auditory sequential memory A1-13)
E5-3. Library Skills
E5-4. Map Reading
E5-5. Note Taking
E5-6. Reference Skills
E5-7. Work Habits

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CONTENT ACADEMIC

MATHEMATICS

Numeration

F1-1. Abacus
F1-2. Base Number Systems
F1-3. Counting (Cardinal Concepts)
F1-4. Expanded Notation
F1-5. Inequalities (more, less, bigger, smaller, greater)
F1-6. Numbers (matching, writing, concept)
F1-7. Number line
F1-8. Numeral Recognition
F1-9. Number Sequence (before, after, between)
F1-10. Number Words
F1-11. One to One Relationship
F1-12. Ordinal Concepts
F1-13. Place Value
F1-14. Roman and Other Numerals
F1-15. Rounding Off
F1-16. Sets
F1-17. Symbols (Math)

Addition

F2-1. Addition
F2-2. Addition Facts
F2-3. Addition, Single Column
F2-4. Addition, Two Column
F2-5. Addition, Multiple Column
F2-6. Addition, Horizontal
F2-7. Addition, Ragged Column
F2-8. Addition with zero
F2-9. Associative Principle
F2-10. Carrying (Regrouping)
F2-11. Commutative Principle
F2-12. Identity Element
F2-13. Missing Factor
F2-14. Subtraction Integration

Subtraction

F3-1. Borrowing (Regrouping)
F3-2. Subtraction
F3-3. Subtraction Facts
F3-4. Subtraction, Horizontal
F3-5. Subtraction with Zero
F3-6. Subtraction, Two Column
F3-7. Subtraction, Three or more columns
F3-8. Subtraction, Ragged Column
F3-9. Addition Integration

Multiplication

Association Principle (see F2-9)
Commutative Principle (see F2-11)
F4-1. Distributive Principle
Identifying Element (see F2-12)
Missing factor (see F2-13)
F4-2. Multiplication
F4-3. Multiplication facts
F4-4. Multiplication, Horizontal
F4-5. Multiplication, One multiplier, carrying
F4-6. Multiplication, One multiplier, no carrying
F4-7. Multiplication, Two or more multipliers, carrying
F4-8. Multiplication, Two or more multipliers, no carrying
F4-9. Multiplication with zero
F4-10. Division Integration

Division

Distributive Principle (see F4-1)
F5-1. Division
F5-2. Division Facts
F5-3. Division, Horizontal
F5-4. Division, One place divisor, one place dividend, one place quotient
F5-5. Division, One place divisor, two place dividend, one place quotient
F5-6. Division, one place divisor, two or more place dividend, two or more place quotient.
F5-7. Division, two place divisor, two place dividend, one place quotient
F5-8. Division, two or more place divisor, two or more place dividend, two or more place quotient
F5-9. Division with Zero
Missing Factor (see F2-13)
F5-10. Remainders
F5-11. Multiplication Integration

Fractions/Decimals/Percent

F6-1. Decimal/Percent Integration
F6-2. Decimals
F6-3. Denominators
F6-4. Fraction/Percent Integration
F6-5. Fractional Parts/ Construction
F6-6. Fractions - Addition
F6-7. Fractions - Basic Concepts
F6-8. Fractions - Division
F6-9. Fractions - Multiplication
F6-10. Fractions - Subtraction
F6-11. Percent
F6-12. Ratio

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CONTENT - ACADEMIC

Money/Time/Measurement/Geometry

F7-1. Basic Geometry
F7-2. Geometric Measurement (area, perimeter, circumference)
F7-3. Geometric Shapes/Construction
F7-4. Making Change
F7-5. Measurement Concepts (farther away, heavier, shorter)
F7-6. Metric Units
F7-7. Money Concepts (coin and currency identification and value)
F7-8. Nongeometric Measurement (pounds, ounces, inches, feet, ruler)
F7-9. Other measures
F7-10. Telling Time (clock reading, hours, minutes, seconds, a.m., p.m.)
F7-11. Temperature
F7-12. Time Concepts (calendar, morning, later, days, years, seasons)
Time Relationships (use Time Perspective A6-8)

Math - General

F8-1. Advanced Mathematics
F8-2. Charts, graphs, tables
F8-3. Equations
F8-4. Estimation (math)
F8-5. Mathematical Concepts
F8-6. Mixed Operations, Inverse Operations
F8-7. Modern Mathematics
F8-8. Practical Mathematics
F8-9. Problem Solving (Math Story Problems)
F8-10. Remedial Mathematics

SOCIAL STUDIES

Economics (G1-____)
Geography (G2-____)
History (G3-____)
Political Science (G4-____)
Psychology & Philosophy (G5-____)
Sociology & Anthropology (G6-____)

SCIENCE

Earth Science (H1-____)
Life Science (H2-____)
Physical Science (H3-____)

PHYSICAL EDUCATION

Gross Motor

I1-1. Balance
I1-2. Bend
I1-3. Body Movements/Body Awareness
I1-4. Bounce
I1-5. Catch
I1-6. Climb
I1-7. Crawl
I1-8. Gallop
I1-9. Head
I1-10. Hop
I1-11. Jump
I1-12. Kick
Protective (see Safety J8- for specific terms)
I1-13. Reach
I1-14. Roll
I1-15. Run
I1-16. Self Support
I1-17. Sit
I1-18. Skip
I1-19. Somersault
I1-20. Stand
I1-21. Throw
I1-22. Walk

Fine Motor

Eye Hand Coordination (use Visual Motor Integration A2-9)
I2-1. Finger Movement
I2-2. Grasping
I2-3. Hand Transfer
I2-4. Manual Dexterity/ Fine Motor Coordination
I2-5. Thumb Finger Opposition

Adaptive Physical Education

I3-1. Blind
I3-2. Chronic Health Problems
I3-3. Deaf
I3-4. Educable Mentally Retarded
I3-5. Neurological
I3-6. Orthopedically Handicapped
I3-7. Profoundly Mentally Retarded
I3-8. Trainable Mentally Retarded

Recreation and Playground Activities

*Not retrievable at this time.

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CONTENT - ACADEMIC

SELF CARE

Toileting

J1-1. Adjust clothing
J1-2. Elimination pattern
J1-3. Flushing
J1-4. Hand cleanliness
J1-5. Indicates when wet/soiled
J1-6. Indication of need
J1-7. Location
J1-8. Stays on toilet
J1-9. Tissue use
J1-10. Uses toilet.

Feeding/Eating

J2-1. Biting
J2-2. Chewing
J2-3. Containers
J2-4. Finger feeds
J2-5. Food textures
J2-6. Licking
J2-7. Opens mouth
J2-8. Peeling, cracking, etc.
J2-9. Self-service
J2-10. Semi-liquid food
J2-11. Semi-solid food
J2-12. Spoon acceptance
J2-13. Swallowing
J2-14. Tongue use
J2-15. Utensil use

Drinking

J3-1. Accepts cup
J3-2. Bottles, cans
J3-3. Cup use
J3-4. Drooling
J3-5. Faucets
J3-6. Filling containers
J3-7. Fountains
J3-8. Pouring
J3-9. Sipping
J3-10. Spilling
J3-11. Straw use
J3-12. Sucking reflex

Grooming

J4-1. Bathing
J4-2. Body parts
J4-3. Clothes
J4-4. Comb/brush
J4-5. Deodorant
J4-6. Drying
J4-7. Face
J4-8. Faucets
J4-9. Hair
J4-10. Hair cutting
J4-11. Hair setting
J4-12. Hands
J4-13. Menstrual
J4-14. Nails
J4-15. Rinsing
J4-16. Shaving
J4-17. Showering
J4-18. Sink
J4-19. Soap
J4-20. Water temperature

Oral Hygiene

J5-1. Brushing routine
J5-2. Brushing schedules
J5-3. Necessary articles

Nasal Hygiene

J6-1. Blowing
J6-2. Indicates need
J6-3. Tissue/handkerchief
J6-4. Wiping

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Clothing Care

J7-1. Drying
J7-2. Folding
J7-3. Hanging
J7-4. Washing

Safety

J8-1. Animal Safety
J8-2. Awareness of danger
J8-3. Bicycle safety
J8-4. Bus safety
J8-5. Car safety
J8-6. Crossing streets
J8-7. Doctors/dentist/nurse
J8-8. Electric cords
D5-10. Protective Vocabulary
J8-9. First Aid
J8-10. Fire drill
J8-11. Foreign objects
J8-12. Plant safety
J8-13. Play equipment safety
J8-14. Protection from attack
J8-15. Seat belts
J8-16. Seeks help
J8-17. Sharp Objects
J8-18. Sidewalks
J8-19. Signs
J8-20. Strangers
J8-21. Telephone use
J8-22. Walking safety
J8-23. Water safety

Dressing/Undressing

J9-1. Accessories
J9-2. Buttons, snaps, zippers
J9-3. Cleanliness
J9-4. Cooperates actively
J9-5. Cooperates passively
J9-6. Dresses
J9-7. Identifies
J9-8. Over coats/jackets
J9-9. Pants
J9-10. Selection
J9-11. Shoes
J9-12. Shoe laces
J9-13. Skirts
J9-14. Socks
J9-15. Underwear

PREVOCATIONAL/VOCATIONAL

Prevocational

K1-1. Changes
K1-2. Collating
K1-3. Comparative shopping
K1-4. Cutting
K1-5. Delivering
K1-6. Folding
K1-7. Fring Benefits
K1-8. "Functional vocabulary"
K1-9. Inventories
K1-10. Job family identification
K1-11. Matching
K1-12. Mold
K1-13. Packaging, stacking, assembling
K1-14. Painting
K1-15. Proper dress
K1-16. Purchasing
K1-17. Purpose of working
K1-18. Safety
K1-19. Sanding
K1-20. Sorting
K1-21. Stapling
K1-22. Stuffing
K1-23. Task Analysis
K1-24. Task completion
K1-25. Tool Use

Vocational

K2-1. Babysitting
K2-2. Body shop
K2-3. Construction
K2-4. Factory
K2-5. Farm skills
K2-6. Florist
K2-7. Food service
K2-8. Hospital aide
K2-9. Janitorial services
K2-10. Sales
K2-11. Service Station

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FINE ARTS AND MUSIC

Fine Arts (L1-____)
Music (L2-____)

CONTENT - INTERPERSONAL

SELF KNOWLEDGE/SOCIAL INTERACTION

Self Knowledge

M1-1. Facts about self
M1-2. Handicaps
M1-3. Name/touch body parts
M1-4. Own voice recording
M1-5. Respond to name
M1-6. Self identification
M1-7. Sex identification

Social Interaction/ Others

M2-1. Affective Display
M2-2. Awareness of others
M2-3. Directions
M2-4. Leadership
M2-5. Play
M2-6. Relationship to adults
M2-7. Relationship to peers
M2-8. Relationship to school
M2-9. Relationship to self
M2-10. Rules
M2-11. Seeks attention
M2-12. Social Behavior

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INSTRUCTIONAL LEVEL DESCRIPTORS

Code #	Grade or Reading Level	Level	Mental Age
PP	Pre-Preschool	-	MA 0-3
P	Preschool	-	MA 3-5
K	Kindergarten	A	MA 5-6
1	1 and gradations	B	MA 6-7
2	2 and gradations	C	MA 7-8
3	3 and gradations	D	MA 8-9
4	4 and gradations	E	MA 9-10
5	5 and gradations	F	MA 10-11
6	6 and gradations	G	MA 11+
7	7 and gradations	-	
8	8 and gradations	-	
9	9 and gradations	-	

INTEREST LEVEL DESCRIPTORS

Code #	Level	Grade
1	Preschool	Preschool, Kindergarten
2	Primary	1, 2, 3
3	Intermediate	4, 5, 6
4	Junior High	7, 8, 9
5	Senior High	10, 11, 12

FORMAT DESCRIPTORS

1. Audio Card
2. Audio Record (phono-disk)
3. Audio Tape - Cassette
4. Audio Tape - reel to reel

5. Braille
6. Book (hard or soft cover)
7. Card (flash card, story card, picture card)
8. Chart, Poster, Study Print, Picture, Graphic Display
9. Color Keyed
10. Diorama, Model, Specimen, Toy, Realia

11. Film (super 8, 8, 16, 35mm, cartridge, sound)
12. Filmloop
13. Filmstrip
14. Flannelboard

15. Game
16. Globe, Map
17. Large Print (print larger than primary type)
18. Puzzle (Crossword, picture)
19. Rebus (materials presented through partial or complete substitution of pictorial or other coded representation for the printed word.)

20. Self Pacing, Programmed (sequenced in frames)
21. Slide (2 x 2)
22. Tactile, Kinesthetic or Manipulative Objects
23. Transparency
24. Workbook, Worktext
25. Worksheet (reproduced or preprinted)
26. Videotape
27. Activity

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INPUT MODE DESCRIPTORS

Sensory channel through which learner receives information from material.

1. Auditory Input: information taken in through hearing
2. Visual Input: information taken in through seeing
3. Tactile Input: information taken in through kinesthetic, haptic, tactile, touch, feel, handle
4. Auditory - Visual Input: simultaneous presentation of auditory and visual information
5. Visual - Tactile Input: simultaneous presentation of visual and tactile information
6. Auditory - Tactile Input: simultaneous presentation of auditory and tactile information

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OUTPUT MODE DESCRIPTORS

Expressive channel through which learner responds to information in material.

1. Verbal: learner required to make a spoken response
2. Non-Verbal: state type of learner response
   - look, listen
   - manipulate
   - move, trace
   - mark, circle
   - print, write
   - no specific response

TEACHER/LEARNER INTERACTION DESCRIPTORS

1. Independent Large Group - more than 6 learners
2. Independent Small Group - less than 6 learners
3. Independent Individual - one learner working alone
4. Teacher Directed Large Group - more than 6 learners working directly with teacher
5. Teacher Directed Small Group - less than 6 learners working directly with teacher
6. Teacher Directed Individual - one learner working with teacher

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EVALUATION DESCRIPTORS

This information will be compiled throughout the year for entry on the back of the card. Do not use this section at this time.

1. Poor
2. Fair
3. Average
4. Good
5. Excellent

LERS LOCATION

This area is to be used as needed by districts wishing to share materials between schools. The Code is set up by the district to indicate individual schools within the district holding each title according to MARS inventory. Assign numbers to each school as needed. To use LERS Location effectively each participating school must have cards for items inventoried in all other schools.

Code: 1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

SCHOOL LOCATION

To be filled in by the school to indicate the location of the title in the building as stated on the inventory. Enter the information according to building needs as cards are received.

SCHOOL LOCATION:

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Not revised for newest descriptors 9-73

SPECIFIC DESCRIPTORS - Alphabetical Listing

CODE #	TERM	DEFINITION
F1-1	ABACUS	Explains abacus or use of it.
A3-1	ABSTRACT REASONING	Arriving at conclusions through the use of symbols or generalizations rather than concrete factual information.
D4-12	ABSTRACT WORDS	(see position words)
E1-18	ABBREVIATION	(see punctuation)
D4-1	ACCENT	Placing accent marks on syllables.
F2	ADDITION - MATHEMATICS - ACADEMIC CONTENT	(Major Skill)
F2-1	ADDITION	General term involving addition concept.
F2-2	ADDITION FACTS	Basic 100 facts from 0 to 9, vertical or horizontal format.
F2-3	ADDITION, SINGLE COLUMN	Three or more addends added in a column, with or without carrying. EXAMPLE: 2 / 4 / +1
F2-4	ADDITION, TWO COLUMN	Two or more addends added in two columns, with or without carrying. EXAMPLE: 22 / +43 or 23 / 36 / +37
F2-5	ADDITION, MULTIPLE COLUMN	Two or more addends added in three or more columns with or without carrying. EXAMPLE: 234 / +123
F2-6	ADDITION, HORIZONTAL	Horizontal format. EXAMPLE: 2 + 17 =
F2-7	ADDITION, RAGGED COLUMN	Problems are uneven columns. EXAMPLE: 237 / +23
F2-8	ADDITION WITH ZERO	Adding with zero. EXAMPLE: 2 + 0 =
E1-1	ADJECTIVES, DETERMINERS	Function and/or use as a part of speech.
F8-1	ADVANCED MATHEMATICS	Presents concepts including and beyond algebra and geometry.
D6-1	ADVENTURE	Stories dealing with danger and risk taking.
E1-2	ADVERBS	Function and/or use as a part of speech.
D1-1	ALPHABET	Say, recognize, sequence or match letters of the alphabet.
D5-1	ALPHABETIZE	Sequential alphabetical arrangement of information
G4-2	ANALOGY	Identify the relationships between words, ideas, or symbols.
D6-2	ANIMAL	Stories dealing with animals.
G6	ANTHROPOLOGY	(see Sociology - Major Skill)
D4-3	ANTONYM, OPPOSITE	Opposite word pairs.
D6-3	ANTHOLOGY	Collection of stories on one topic.
A3-8	APPLIED RELATIONSHIPS	A synthesizing process - organizing known information in order to reason and evaluate a present situation.
E4-1	ARTICULATION	Exercises requiring use of lips, mandible, tongue, and soft palate to form consonantal and some vowel phonere speech sounds.
F2-9	ASSOCIATIVE PRINCIPLE	Explains, gives practice or applies in addition and multiplication. The grouping of the numbers does not affect the sum. EXAMPLE: (a + b) + c = a + (b + c).
A1	AUDITORY - COGNITIVE PROCESS	(Major Skill)
A1-1	AUDITORY ACUITY	Ability to respond to pure tone audiometry within normal limits and to hear faint sounds at all necessary pitches or frequencies.
A1-2	AUDITORY ATTENTION SPAN	Ability to screen auditory sensory impulses for a certain length of time i.e. selecting one portion of the available auditory stimuli while ignoring other auditory stimuli.
A1-2	AUDITORY CLOSURE	Ability to complete or recognize the missing part or gap when the auditory unit is incomplete.
A1-4	AUDITORY CONSTANCY	Ability to perceive an auditory unit as possessing unchanged properties regardless of the variability or distortion of the stimulus.
A1-6	AUDITORY DISCRIMINATION	Ability to recognize gross or fine similarities or differences between sounds - environmental or speech.
A1-7	AUDITORY FIGURE GROUND	Ability to focus on one part of an auditory configuration so it stands out clearly (figure) while the remainder forms a background (ground).
A1-8	AUDITORY IMAGE	Ability to remember an auditory stimulus after the stimulus has been removed. See Auditory Memory.
A1-5	AUDITORY LOCALIZATION	Ability to locate source of auditory stimuli at varying distances from the ear.
A1-9	AUDITORY MEMORY	Develops and extends memory for auditorily presented information, store and retrieve information.
A1-10	AUDITORY MOTOR INTEGRATION	Ability to associate organize and relate meaningful units of auditory and motor information.
A1-11	AUDITORY PERCEPTION	Ability to respond to and gain meaning from auditory information stimuli (General Term)
A1-12	AUDITORY PITCH, VOLUME, TONE	Pitch - number of cycles per second of a sound; Volume - force or loudness of sound; Tone - Quality of the sound.
A1-13	AUDITORY - VISUAL INTEGRATION	Ability to organize and relate meaningful units of auditory visual information.
A1-14	AUDITORY - VOCAL INTEGRATION	Relate units of auditory and vocal information.
C2-1	AWARENESS	(see Body Image)
C2-2	BALANCE	(see Body Movement)
F1-2	BASE NUMBER SYSTEM	Presents number systems other than base 10.
F7-1	BASIC GEOMETRY	Presents the basic concepts of shapes, lines, angles used in geometric calculations.
D7-1	BEGINNING READING	Designed for teaching children, adolescents, or adults just learning to read.

NOTE: Use General Terms and Major Skills only when more specific descriptors are not available or do not apply.

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CODE #	TERM	DEFINITION
C6-4	BIOGRAPHY	Story about the life history of a real person.
D2-1	BLENDS (final)	Phonetic blends such as -nt, -nd, -nk, -all, -ill, -oth, etc., at the end of words.
D2-2	BLENDS (initial)	Phonetic blends such as bl, sn, sp, str, at the beginning of words.
E4-1	BODY IMAGE, AWARENESS	Locate, name, touch the various body parts; awareness of the body.
C2-2	BODY MOVEMENT, BALANCE	Movement of the body in various ways.
F3-1	BORROWING (regrouping)	Changing tens to ones, hundreds to tensin subtraction. Code if this skill is present in the problem.
E2-1	CAPITAL LETTERS	Shows formation or gives practice on cursive or manuscript capital letters.
E1-3	CAPITALIZATION	When and what letters to capitalize.
F2-10	CARRYING (regrouping)	Changing ones to tens, tens to hundreds in addition. Code if this skill is present in the problem.
D1-2	CATEGORIZE	(see classify)
D3-1	CAUSE AND EFFECT	After reading story, state cause and effect. EXAMPLE: If one thing happens, what will happen then.
D8-2	CHARTS, GRAPHS, TABLES	Purpose and/or use of charts, graphs, and tables.
C6-5	CLASSICS	Stories with titles accepted as classics in literature, i.e. Ivanhoe, Tale of Two Cities
D1-2	CLASSIFY, CATEGORIZE	Develops concept of "classness" or grouping. EXAMPLE: Fruits: Orange, Pear Animal: Cat, Dog
I5-1	CLOTHING CARE	Deals with laundering clothing, providing incidental maintenance and simple alterations.
E4-2	CLUTTERING	Exercises for a disorder of time or rhythm characterized by unorganized, hasty spurts of speech often accompanied by slurred articulation.
A2-2	COGNITION	Comprehend, understand, discover, awareness recognition of information in various forms.
A	COGNITIVE-PROCESS	(Major Area)
D1-3	COLOR CONCEPTS	Color matching or understanding and naming of colors.
D1-4	COLOR WORDS	Recognition of color words; red, blue, etc.
D7-3	COMBINED APPROACHES	(see Experimental, New Alphabet)
E4-3	COMMUNICATION SKILLS	The acquisition of good listening and speaking habits. (General term.)
F2-11	COMMUTATIVE PRINCIPLE	Explains, gives practice, or applies in addition and multiplication. The order of the numbers does not affect the sum. EXAMPLE: a x b = b x a.
D4-4	COMPARATIVES	Deals with comparison words. EXAMPLE: big, bigger, biggest
D4-5	COMPOUND WORDS	Deals with compound words - two small words into a large word.
E1-4	COMPOSITION	Shows rules of grammar and how to construct written language.
D3-2	COMPREHENSION	Involves reading comprehension and requires a verbal or written response on the part of the learner. (General Term).
D3	COMPREHENSION - READING - ACADEMIC CONTEXT	(Major Skill)

CODE #	TERM	DEFINITION
D1-5	CONCEPT FORMATION	Learner understands relationships of objects and abstract ideas to one another.
E1-5	CONJUCTION, PREPOSITION, INTERJECTION	Function, how to use and identify these parts of speech.
D2-3	CONSONANT BLENDS	Exercises on this type of phonetic element. EXAMPLE: br, sl, tr, str, (General Term).
D2-4	CONSONANTS	Exercises including any speech sound which is produced by blocking the air stream (p,b,t,d, k,g,f,v,sh,ch,j,m,h,w,y). (General Term).
D2-5	CONSONANT (final)	Learner must identify or work with final consonant sound or symbol. EXAMPLE: door, soar, clig
D2-6	CONSONANT (initial)	Deals with initial consonant sound or symbol. EXAMPLE: Candy, dog
D2-7	CONSONANT (medial)	Deals with medial consonant sound or symbol. EXAMPLE: today, habit
D2-8	CONSONANT VARIANTS	Unusual or irregular sounds and letter combinatio qu, x, y, r controlled.
D3-3	CONTEXT CLUES	Response is derived by gaining meaning from text and supplying the answer.
D4-6	CONTRACTIONS	Use of contractions and/or how they are formed. EXAMPLE: are not = aren't
A3-3	CONVERGENT PRODUCTION	Ability to problem solve or deduce information from given information to get the one best outcome or answer.
D1-6	COPY, TRACE	Reproduce or follow a visual or tactile form.
F1-3	COUNTING (cardinal concept)	Involves "one, two, three" concept of numbers, rote counting.
E1-6	CREATIVE ACTIVITIES, WRITING	Designed to promote creative action or productio
E1-6	CREATIVE WRITING	(see Creative Activities)
D3-4	CRITICAL READING	Learner draws inferences to separate fact from fiction and to determine if the facts presented by the writer justifiably lead to conclusions given by the writer.
E2-2	CURSIVE HANDWRITING	Requires cursive handwriting or the joining of letter strokes through flowing movements of the hand and arm.
D1-7	CUT, PAST, POSITION	Requires use of scissors, positioning, and pasti objects on a page.
I4-1	DANGER	Deals specifically with understanding of danger, danger situations, and avoidance procedures.
F6-2	DECIMALS	Operations using decimals or the concept of decimal places. EXAMPLE: .03, $1.00
F6-1	DENOMINATORS	The part of a fraction telling how many equal parts of a whole. Also included reducing a fraction to lowest terms, common denominators.
D4-7	DESCRIPTIVE WORDS	Words used to describe, to give the image.
D1-8	DESIGNS, PATTERNS	Learner response is making block, etc, designs like stimuli or reproducing a pattern.
E1-1	DETERMINERS	(see Adjectives)
D7-2	DEVELOPMENTAL READING	Provides a developmental approach to teaching reading. EXAMPLE: Basal Reading Series.

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CODE #	TERM	DEFINITION
D5-2	DICTIONARY	Explains th use of or presents exercises for developing skill in the use of the dictionary. A dictionary.
D2-9	DIGRAPHS	Two letters that produce a single sound. (General term).
D2-10	DIGRAPHS (consonant)	Two consonants that produce a single sound. EXAMPLE: wh, sh, wr, ch.
D2-11	DIGRAPHS (vowel)	Two vowels that produce a single sound. EXAMPLE: oa, ai, au, aw.
D2-12	DIPHTHONGS	Vowel sound combinations that start at or near the articulatory position for one vowel and move toward another, as in toy. EXAMPLE: ou, ow, oi, oy, ew.
C2-3	DIRECTIONALITY	Develops the external awareness of "sidedness" concept of leftness and rightness. (see Laterality, Left to Right Progression, and Position Words.)
F4-1	DISTRIBUTIVE PRINCIPLE	Multiplication or division process over addition. EXAMPLE: $m \times (n + p) = (m \times n) + (m \times p)$
A3-4	DIVERGENT PRODUCTION	Ability to generate, produce or organize varied information from given information - implies transfer of learning or creative ability.
F5	DIVISION - MATH - ACADEMIC CONTENT	(Major Skill)
F5-1	DIVISION	General term involving concept of division.
F5-2	DIVISION FACTS	Basic division facts to 9, vertical or horizontal.
F5-3	DIVISION, HORIZONTAL	Problem presented in linear form. EXAMPLE: 81 ÷ 9 =
F5-4	DIVISION, ONE PLACE DIVISOR, ONE PLACE DIVIDEND, ONE PLACE QUOTIENT.	EXAMPLE: $2\overline{)6}$ (3)
F5-6	DIVISION, ONE PLACE DIVISOR, TWO OR MORE PLACE DIVIDEND, TWO OR MORE PLACE QUOTIENT	EXAMPLE: $2\overline{)24}$ (12)
F5-7	DIVISION, TWO PLACE DIVISOR, TWO PLACE DIVIDEND, ONE PLACE QUOTIENT	EXAMPLE: $24\overline{)48}$ (2)
F5-8	DIVISION, TWO OR MORE PLACE DIVISOR, TWO OR MORE PLACE DIVIDEND, TWO OR MORE PLACE QUOTIENT	EXAMPLE: $10\overline{)210}$ (21)
F5-9	DIVISION WITH ZERO	Dividing with zero in problem EXAMPLE: $2\overline{)202}$
D1-9	DOT JOINING	Presents letters or numbers which when joined in proper sequence form a picture.
C6-6	DRAMA	Contains plays, skits, couplets, etc.
E1-7	DRAMATIZATION	Requires learner to perform verbal and/or pantomime activities to act out a role.
D3-8	DRAWING CONCLUSIONS, PREDICTING OUTCOMES	Requires arriving at a conclusion from information presented or predicting the outcome or ending of a story.
I5-2	DRESSING SKILLS	Deals with the fine motor movements needed to button, lace, tie, etc., in order to dress oneself.

CODE #	TERM	DEFINITION
H1-	EARTH SCIENCE	Deals with solar system, prehistoric life, weather, etc. (Major Skill)
E4-4	ECHOLALIA	Deals with the automatic involuntary repetition of heard phrases and sentences.
G1	ECONOMICS	Emphasizes the social science area of economics, transportation, communications, industry, occupations, etc. (Major Skill)
E1	ENGLISH GRAMMAR AND COMPOSITION LANGUAGE ARTS - ACADEMIC CONTENT	(Major Skill)
F8-3	EQUATIONS	How to construct and/or solve mathematical equations.
F8-4	ESTIMATION (Math)	How to estimate or practice problems on this skill.
A3-5	EVALUATION	Ability to judge, evaluate, decide or test the correctness or suitability of information.
F1-4	EXPANDED NOTATION	Rename number with 2 or more addends. EXAMPLE: 362 = (300 + 60 + 2).
D7-3	EXPERIMENTAL, NEW ALPHABET, COMBINED APPROACHES	Reading material not fitting traditional category, using different alphabet or new approaches.
E4-5	EXPRESSIVE LANGUAGE	Ability to produce language - meeting both structure (syntax) and meaning (semantic) criterion.
C2-4	EYE EXERCISES	Designed to develop the control of eye movements, focus.
C2-5	EYE - HAND COORDINATION	Designed to improve the coordination of the eyes to a motor movement of the hands; midline crossing.
D6-7	FAIRY TALES	Imaginative and fictional narratives which deal with unreal beings. Typically of folk origin and written for children.
D6-8	FANTASY	Story content which is not easily believable, such as Walter Mitty type.
I5-3	FEEDING, EATING, DRINKING	Deals with establishment of sucking/seeking reflex; sequential eating and drinking skills; socially acceptable manners and eating habits.
D4-8	FIGURATIVE LANGUAGE	Use of a word which primarily means one thing but is applied to another meaning; symbols, metaphors.
E1-8	FIGURES OF SPEECH	Uses or requires student to give literal translations for figures of speech.
J	FINE ARTS AND MUSIC-ACADEMIC CONTENT	(Major Area)
J1	FINE ARTS	Includes fine arts such as drawing, painting, sculpture, ceramics. (Major Skill)
C2-6	FINE MOTOR	Trains small muscles to work together effectively. EXAMPLES: Coloring, bead stringing, pegboard.
D6-9	FOLK TALES	Stories circulated by word of mouth among the common people; tales traditionally told about people which are characteristically anonymous, timeless, placeless.
D3-6	FOLLOWING DIRECTIONS	Involves the reading comprehension skill for following written directions.
D6-10	FOREIGN THEME	Story theme which centers around foreign people or countries.

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CODE #	TERM	DEFINITION
F6-3	FRACTIONAL PARTS	Involves fractional portions of a whole, with numerical representations. EXAMPLE: 1/3 1/3 1/3
F6	FRACTIONS - MATH ACADEMIC CONTENT	(Major Skill)
F6-4	FRACTIONS	Exercises with the operations using fractions or presents the concepts and terms related to fractions - like and unlike fractions; proper and improper fractions.
F6-5	FRACTIONS, ADDITION	Problems involving addition of fractions.
F6-6	FRACTIONS, DIVISION	Problems involving division of fractions.
F6-7	FRACTIONS, MULTIPLICATION	Problems involving multiplication of fractions.
F6-8	FRACTIONS, SUBTRACTION	Problems involving subtraction of fractions.
D6-11	FRONTIER PIONEER	Stories about frontier and pioneer days, either historical or fictional in nature.
G2	GEOGRAPHY	Explains the science of the earth, including a study of land, air, the distribution of plant and animal life, man and his industries and the interaction of these factors. (Major Skill)
F7-2	GEOMETRIC SHAPES	Involves simple geometric forms. EXAMPLES: circle, square.
F7-3	GEOMETRIC MEASUREMENT	How to find area, perimeter, circumference, volume; presents such problems for practice.
E1-9	GRAMMAR	Uses grammar and communication skills of everyday conversation and writing. EXAMPLE: inflections, classes of words, syntax.
D8-2	GRAPHS	(see Charts)
I1-1	GROOMING	Deals with skills pertaining to care of the body, use of grooming aids, appropriate selections of clothing.
C2-7	GROSS MOTOR	Trains large muscles to work together effectively in general motor coordination. EXAMPLE: hop, jump, skip
C1-1	GUSTATORY OR TASTE PERCEPTION	Ability to gain meaning from taste or flavor information. (General Term).
E2	HANDWRITING - LANGUAGE ARTS ACADEMIC CONTENT	(Major Skill)
D2-14	HARD SOUNDS	Involves differentiation between hard vs. soft sounds of letters. EXAMPLE: candy - cindy
I	HEALTH AND PHYSICAL EDUCATION ACADEMIC CONTENT	(Major Area)
I1	HEALTH EDUCATION	Presents factual information concerning health and attempts to encourage attitudes necessary for the individual to make use of the information he has gained. (Major Skill).
A3	HIGHER LEVEL - COGNITIVE - PROCESS	(Major Skill)
D7-4	HI INTEREST - LOW VOCABULARY	Story designed to motivate reader's interest with easy level vocabulary load.

CODE #	TERM	DEFINITION
G3	HISTORY	Provides a systematic study of the past through analyzing, coordinating and explaining past events. (Major Skill).
I5-4	HOME AND FAMILY LIVING SKILLS	Deals with performance of daily household chores.
D4-9	HOMONYMS	Deals with sound - alike words with different meanings. EXAMPLES: Blue - Blew.
D6-12	HUMOR	Story there primarily humorous in nature.
D1-10	IDENTIFICATION, RECOGNITION	Learner must recognize or identify a picture, shape, object, etc.
F2-12	IDENTITY ELEMENT	Zero addition. EXAMPLE: a + 0 = a One in multiplication. EXAMPLE: a x 1 = a
D3-7	IMPLICATION	(see Inference)
I5-5	INDEPENDENCE	Deals with ability to appropriately exercise personal prerogative in relationship to the activities of daily living; skills in effective interaction with community routines and affairs.
D7-5	INDEPENDENT READING	Designed for pleasure reading. Not a test or basal reader.
F1-5	INEQUALITIES (Math)	Deals with such things as greater than, less than, more, bigger, smaller, etc.
D3-7	INFERENCE OR IMPLICATION	Requires reading to select or state logical happenings decided from known facts.
I4-2	INJURY	Develops understanding of what is an injury to self and others and procedures to follow in dealing with injury.
E1-5	INTERJECTION	(See Conjunction)
D3-8	INTERPRETATION	Learner reads a selection and then interprets or retells what the author said.
D2-15	ISOLATED PHONETIC SOUNDS	Requires production of phonetic sound for a single letter or combination of letters. EXAMPLES: P or Pl
E	LANGUAGE ARTS ACADEMIC CONTENT	(Major Area)
D7-6	LANGUAGE ARTS CORRELATED	Presents reading by correlating reading, writing, and speaking skills.
E4-6	LANGUAGE DEVELOPMENT	Aids in speech - language development through repetition of certain sounds and language patterns. (General Term)
C2-8	LATERALITY	Develops the internal awareness of sidedness.
E2-3	LEFT HANDED HANDWRITING	Left handed writing, cursive or manuscript, capital or lower case.
C2-9	LEFT TO RIGHT PROGRESSION	Deals with moving across a page from left to right.
D5-3	LIBRARY SKILLS	Exercises or information on how to use the various aids in the library.
H2	LIFE SCIENCE	Deals with plants, animals, reproduction, etc. (Major Skill)
D1-16	LIKENESS AND DIFFERENCE	(see relationships)

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CODE #	TERM	DEFINITION
D1-11	LISTENING SKILLS	Designed to improve such skills as attention to auditory stimuli, comprehension of speakers purpose, attention to cues in speaker's language which are necessary for effective listening comprehension, and retention of orally presented materials.
D7-7	LINGUISTIC APPROACH	Reading approach utilizing the regular pattern of language, i.e., and inductive approach to the discovery of sound - letter relationship.
D6	LITERATURE - READING ACADEMIC CONTENT	(Major Skill)
D6-13	LITERATURE	General Term for pleasure reading material.
D3-9	LOCATING ANSWERS, READING FOR DETAIL	Requires finding answers to question from the reading text.
E2-4	LOWER CASE LETTERS	Involves formation or practices manuscript or cursive small form letters.
D2-10	MAIN CHARACTERS	(see main idea)
D3-10	MAIN IDEA OR CHARACTER	From reading selection, student must grasp the central thought or the main character.
C2-10	MANUAL DEXTERITY	Ability to move hands and fingers to manipulate objects in specific ways (see fine motor).
E4-7	MANUAL (sign) LANGUAGE	Deals with a nonverbal communication method for the deaf using movements and positions of arms, hands, and fingers with appropriate facial expressions to indicate letters and words.
E2-5	MANUSCRIPT HANDWRITING	Involves manuscript writing, printing.
D5-4	MAP READING	Exercises on map and/or globe reading.
D1-12	MATCHING	Exercises involving the [illegible] of matching one [illegible]
F8-5	MATHEMATICAL CONCEPTS	General Term involving concepts related to computation, quantitative relationships, systematic reasoning, or the structure of configurations.
F	MATHEMATICS ACADEMIC CONTENT	Academic Content (Major Area) (Major Area)
F8	MATHEMATICS	General Term
F7-4	MEASUREMENT CONCEPTS	Farther away, heavier, shorter; See also Inequalities.
F7-5	METRIC UNITS	Exercises which teach the system of weights and measures based on meter and kilogram.
F2-13	MISSING FACTOR	Math problem with a part missing. EXAMPLE: 2 + __ = 4
F8-6	MIXED OPERATIONS, INVERSE OPERATION	When two or more types of operations are used to solve a problem. EXAMPLE: Subtract then Add.
I5-6	MOBILITY	Deals with ability to transport oneself from one location to another; to use public transportation.
F7-	MONEY, TIME, MEASUREMENT, GEOMETRY-MATHEMATICS, ACADEMIC CONTENT	(Major Skill)
F7-6	MONEY CONCEPTS	Exercises which involve money values and how to count money and make change.
F8-7	MODERN MATHEMATICS	Uses a method of discovery of the underlying principles rather than rote learning.
D3-11	MOOD	From reading material, learner identifies mood or tone of story.

CODE #	TERM	DEFINITION
C2-	MOTOR - SENSORIMOTOR - PROCESS	(Major Skill)
D4-10	MULTIPLE USE WORDS	Exercises which teach the multiple use of such words as to, two, too.
F4	MULTIPLICATION - MATHEMATICS ACADEMIC CONTENT	(Major Skill)
F4-2	MULTIPLICATION	Explains, provides practice with or demonstrates application of the operation of multiplication. General Term.
F4-3	MULTIPLICATION FACTS	Basic facts of 0x0 through 9 x 9.
F4-4	MULTIPLICATION, HORIZONTAL	Problems in linear form. EXAMPLE: 2 x 13 =
F4-5	MULTIPLICATION, ONE MULTIPLIER, CARRYING	EXAMPLE: (2) 27 x3 81
F4-6	MULTIPLICATION, ONE MULTIPLIER, NO CARRYING	EXAMPLE: 11 x2 22
F4-7	MULTIPLICATION, TWO OR MORE MULTIPLIERS, CARRYING	EXAMPLE: 53 x36 318 159 1908
F4-8	MULTIPLICATION, TOW OR MORE MULTIPLIERS, NO CARRYING	EXAMPLE: 22 x13 66 22 286
F4-9	MULTIPLICATION WITH ZERO	How to multiply with zero in problem.
J2	MUSIC	Discusses or contains instrumental and/or vocal musical activities. (Major Skill).
D6-14	MYSTERY	Stories involving events that excite curiosity because they remain obscure or secret.
D6-15	MYTHOLOGY	Stories where the theme is an explanation of a natural phenomenon or premitive religion; legend.
I1-2	NASAL HYGIENE	Develops socially acceptable skills pertaining to caring for the nose.
D6-16	NATURE	Has stories involving the outdoors, conservation or information about the plant, animal world.
D7-3	NEW ALPHABET	(see Experimental)
D7-7	NONGEOMETRIC MEASUREMENT	Exercises concerning pounds, ounces, inches, feet, yards, ruler - but not perimeter, circumference, or area. See Geometric Measurement.
D7-8	NON ORAL READING APPROACH	Teaches reading without calling for verbal response.
D5-5	NOTE TAKING	Exercises on how to take notes.
E1-10	NOUN	How to identify or use proper or common nouns.
F1-6	NUMBERS	Presents the concept of numbers, number writing, number matching.
F1-7	NUMBER LINE	Presents concept and/or exercises using number line.
F1-8	NUMERAL RECOGNITION	Provides exercises which require the student to label the numerical symbol.
F1-9	NUMBER SEQUENCE	Numbers coming before, after, between.

CODE #	TERM	DEFINITION
F1-10	NUMBER WORDS	Presents or uses number words. EXAMPLE: One, two, three.
F1-	NUMERATION - MATHEMATICS ACADEMIC CONTENT	(Major Skill)
C1-2	OLEFACTORY OR SMELL PERCEPTION	Ability to gain meaning from scent or smell information. (General Term).
F1-11	ONE TO ONE RELATIONSHIP	Concept of the pairing of one to one. EXAMPLE: Six horses and Six men
D4-3	OPPOSITES	(see Antonym)
I1-3	ORAL HYGIENE	Develops skills pertaining to a hygienic and cosmetic care of the teeth and gums.
F1-12	ORDINAL CONCEPTS	Teaches the concept of number order; i.e. first, second, third.
E1-11	ORGANIZATION	How to structure thoughts and ideas for either verbal presentation or written composition.
E1-12	OUTLINING	Actually presents how to outline.
E1-13	PARAGRAPH DEVELOPMENT	How to develop a paragraph through main sentence and sub topics.
D1-13	PART WHOLE RELATIONSHIP	Involves fitting parts together and how they are used. EXAMPLE: conjunction, preposition, participle
D1-7	PASTE	(see Cut)
D1-8	PATTERNS	(see Designs)
F6-9	PERCENT	Concept of percent is introduced or elaborated.
I4-3	PERSONAL SAFETY	Deals with concept of danger and understanding of safety in various situations. General Term.
G5	PHILOSOPHY	(see Psychology)
D7-9	PHONEMIC ALPHABET	Contains written language in which there is a one to one relationship between the speech sound and the symbol which represents it.
D2-16	PHONETIC ANALYSIS	Practice in the analysis and study of words in terms of their constituent speech sound elements.
D2	PHONICS - READING ACADEMIC CONTENT	(Major Skill)
D2-17	PHONICS RULES	Learner completes exercises by following a previously stated phonic rule.
E1-15	PHRASE	A part of a sentence.
I2-1	PHYSICAL EDUCATION	Designed to promote desirable physical development, motor skills, attitudes, and habits of conduct. (Major Skill)
H3	PHYSICAL SCIENCE	Deals with machines, energy, motion, electricity, etc. (Major Skill)
F1-13	PLACE VALUE	Introduces or elaborates on the concept of place value in any base number system; units, tens, hundreds.
I3	PLAYGROUND ACTIVITIES	(see RECREATIONAL - Major Skill)
D4-11	PLURALS	Practice in forming plurals of words. EXAMPLE: mats, hats.
G4	POLITICAL SCIENCE	Deals with government, civil rights, etc. (Major Skill)
D1-7	POSITION	(see Cut)
D4-12	POSITION WORDS, ABSTRACT WORDS	Words indicating position such as over, under, between; other abstract words such as after, before, since, etc.

CODE #	TERM	DEFINITION
D4-13	POSSESSIVES	Practice in forming possessives of words. EXAMPLE: boy's hat
D6-17	POETRY	Includes rhymed and blank verse.
F8-8	PRACTICAL MATHEMATICS: Business-type math.	i.e. budgeting, check writing, household accounts, money handling.
I4-4	PRECAUTION	Deals with observance of safety precautions in active play, as a pedestrian, in moving vehicles, with fire, electricity, etc.
E1-16	PREDICATE	Use of action words in sentence.
D3-5	PREDICTING OUTCOMES	(see Drawing Conclusions)
D4-14	PREFIX	Deals with prefixes. EXAMPLE: dis - satisfied
E1-5	PREPOSITION	(see Conjunction)
K1	PREVOCATIONAL	Deals with development of attitudes and skills necessary in a job situation.
K	PREVOCATIONAL/VOCATIONAL	(Major Area)
F8-9	PROBLEM SOLVING (Math Story Problem)	Involves some reading to gather information necessary for solving a math problem.
A3-6	PROBLEM SOLVING SKILLS	Deals with learning to solve problems. (see Convergent Production)
B7	PROGRAMS - READING ACADEMIC CONTENT	(Major Skill)
E1-17	PRONOUN	Identification or proper use of pronouns such as he, she, etc.
E4-8	PRONUNCIATION	Deals with correct articulation of a sound or of words.
D4-15	PROTECTIVE VOCABULARY	Words thought to be useful for personal protections. EXAMPLE: poison, stop, danger, hot.
G5	PSYCHOLOGY AND PHILOSOPHY	Deals with Religious, etc. (Major Skill)
E1-18	PUNCTUATION, ABBREVIATION	Function and/or proper use of punctuation marks and abbreviations of words.
E1-19	QUESTION	Deals with a sentence in the form of a question.
F6-10	RATIO	Presents the arithmetical concept of ratio and/or problems for practice.
D1	READINESS - READING ACADEMIC CONTENT	(Major Skill)
D1-14	READINESS SKILLS	Develops beginning skills in preparation for academic experiences. General term
B	READING - ACADEMIC CONTENT	(Major Area)
D3-12	READING SPEED - FLUENCY	Develops rate and smooth flow of reading.
D3-9	READING FOR DETAIL	(see Locating Answers)
D3-12	READING SPEED	Designed to increase reading rate.
E4-9	RECEPTIVE LANGUAGE	The component of language encompassing an individual's comprehension of verbal, written, or other forms of communication.
D1-10	RECOGNITION	(see Identification)
I3-1	RECREATIONAL AND PLAYGROUND ACTIVITIES	Activities by which persons refresh themselves mentally and physically; playground games, etc. (Major Skill)

CODE #	TERM	DEFINITION
D5-6	REFERENCE SKILLS	How to locate materials by use of index, table of contents, etc.
F3-1 & F2-10	REGROUPING	(see Borrowing, carrying)
D1-15	RELATIONSHIP, LIKENESS AND DIFFERENCE	How things go together. EXAMPLE: plate/knife/fork/spoon/frying pan. Also deals with the ways things are alike or different.
D6-18	RELIGION	Story theme about religion or religious leaders.
F5-10	REMAINDERS (Math)	Deals with remainders in division.
F8-10	REMEDIAL MATHEMATICS	Corrects faulty learning and/or increases the efficiency of performance in math.
D7-10	REMEDIAL READING	Corrects faulty learning and/or increases the efficiency of performance in reading.
E1-20	REPORTS	How to write reports or to organize to give a good oral report.
I3-7	RESPONSIBILITY	Deals with ability to accept and carry out tasks in a responsible manner.
D1-16	REVERSALS	Deals with eliminating single letter or number reversals (d,b); inter-word reversals (big-dig); or whole word reversals (saw-was) in reading or writing.
D1-17	RHYMES, RHYMING WORDS	Deals with rhyming words in some manner.
D6-19	RIDDLES	Deals with jokes, limericks, etc.; involves problem solving and requires an answer.
F1-14	ROMAN AND OTHER NUMERALS	How to make, read, and/or use Roman, Egyptian, etc. numerals.
D4-16	ROOT WORD	Deals with base word parts and shows how other words are developed by adding prefixes and suffixes.
F1-15	ROUNDING OFF	Introduces or further elaborates the concept of rounding off numbers.
D6-20	RURAL THEME	Story set in rural area.
I4	SAFETY	Presents factual information concerning safety practices and attempts to encourage attitudes necessary for the individual to make use of the information he has gained. (Major Skill)
H	SCIENCE - ACADEMIC CONTENT	(Major Area)
D6-21	SCIENCE FICTION	Stories of a fantasy like nature often based on projectives of scientific and technological advances-
D6-25	SCIENCE RELATED	Reading material related to content of a science area.
I5	SELF CARE	Develops concepts and skills related to personal care and self help. (Major Skill)
I5-8	SELF - HELP	General Term
C	SENSORIMOTOR - PROCESS	(Major Area)
C1	SENSORY - SENSORIMOTOR - PROCESS	(Major Skill)
E1-21	SENTENCE	Learner indicates or makes a complete sentence.
E1-22	SENTENCE BUILDING	(see Sentence Structure)
E1-22	SENTENCE STRUCTURE, BUILDING	How to construct a sentence, i.e., the grammatical components required.

CODE #	TERM	DEFINITION
D1-18	SEQUENCE	Requires learner to rearrange a series of pictures, letters, etc., in proper order.
D3-13	SEQUENCE EVENTS OR IDEAS	Verbally related storyline in proper sequence or in any manner develop an idea of temporal order of a story.
F1-16	SETS	Teaches the concept of sets and/or sub sets, how to identify, various types, how to count the set.
D3-14	SCANNING	(see Skimming)
F7-2	SHAPE	(see Geometric Shapes)
D2-18	SILENT LETTERS	Deals with silent letters. EXAMPLE: rule, knife
D4-23	SIGHT WORDS	(see Vocabulary)
F1-5	SIZE	(see Inequalities)
D3-14	SKIMMING, SCANNING	Deals with technique of skimming or scanning in reading.
C1-2	SMELL PERCEPTION	(see Olefactory)
G6	SOCIOLOGY AND ANTHROPOLOGY	Deals with communities, customs, family, minorities, etc. (Major Skill)
G	SOCIAL STUDIES - ACADEMIC CONTENT	(Major Area)
D6-26	SOCIAL STUDIES RELATED	Reading material which is related to an area of social studies content.
D2-19	SOFT SOUNDS	Differentiation between hard and soft sounds. EXAMPLE: Crackle vs. Center.
D2-20	SOUND BLENDING	Requires a student to produce a word from separate sounds. EXAMPLE: b - a - t = bat
E4-10	SOUND SUBSTITUTION	Deals with articulation disorder characterized by replacing one sound for another. EXAMPLE: Wed for Red.
D2-21	SOUND SYMBOL RELATIONSHIP	Match auditory representation to visual clue. EXAMPLE: match "p" sound to letter p or picture beginning with that sound.
E2-5	SPACING	How to space between letters or words in handwriting.
C2-11	SPATIAL ORIENTATION, RELATIONSHIP	Recognition of the state of adjustment of the body or other objects in relation to the immediate environment.
C2-11	SPATIAL RELATIONSHIP	(See Spatial Orientation)
D4-17	SPECIALIZED WORDS	Deals with teaching of words for days of the week, months of the year, holidays. See Time Concepts.
D3-15	SPECIFIC RECALL	Learner must recall specific information from reading material.
	SPEECH AND LANGUAGE DEVELOPMENT - LANGUAGE ARTS - ACADEMIC CONTENT	(Major Skill)
E4-11	SPEECH DEVELOPMENT	Designed to foster good speech habits.
E3	SPELLING - LANGUAGE ARTS ACADEMIC CONTENT	(Major Skill)
E3-11	SPELLING WORDS	Designed to teach the formation of words by combining letters; learning of spelling words.
E3-2	SPELLING DEMONS	A group of words that are commonly misspelled by a large percentage of persons.
E3-3	SPELLING PATTERNS	Teaches the spelling of words which have similar parts or which rhyme.

CODE #	TERM	DEFINITION
E3-4	SPELLING RULES	Spelling rules included in material.
D6-22	SPORTS	Story theme about sports or sports figures.
D5-	STUDY SKILLS - READING ACADEMIC CONTENT	(Major Skill)
E4-12	STUTTERING	Flow of speech is interrupted abnormally by repetition or prolongations of a sound or syllable or posture, or by avoidance and struggle reactions.
E1-23	SUBJECT	Deals with function of the subject of a sentence or use of a subject.
E1-24	SUBJECT VERB AGREEMENT	Deals with this skill. EXAMPLE: he goes.
D6-19	SUBSTITUTION (Linguistic)	Formation of words through substitution of letters. (hat, cat, bat)
	SUBTRACTION - MATHEMATICS ACADEMIC CONTENT	(Major Skill)
F3-2	SUBTRACTION	Deals with the operation of subtraction. General Term.
F3-3	SUBTRACTION FACTS	Basic facts of 0-0 through 18-9.
F3-4	SUBTRACTION, HORIZONTAL	Only when problem presented in linear form. EXAMPLE: 8 - 3 = 5
F3-5	SUBTRACTION WITH ZERO	How to subtract with zero in problem. EXAMPLE: 205 - 2
F3-6	SUBTRACTION, TWO COLUMN	With or without borrowing. EXAMPLE: 45 -23
F3-7	SUBTRACTION, THREE OR MORE COLUMNS	With or without borrowing. EXAMPLE: 321 -274
F3-8	SUBTRACTION, RAGGED COLUMN	Only when columns are uneven. EXAMPLE: 123 - 2
D4-20	SUFFIXES	How to form other words by addition of an affix at the end of the word. EXAMPLE: Understandable.
E1-25	SUMMARY	Relate important elements of a reading selection or verbal presentation.
D4-21	SYLLABLE	Requires dividing words into syllables.
F3-17	SYMBOLS (Math)	Specifically teaches the meaning and/or functions of mathematical symbols or signs.
D4-22	SYNONYM	Deals with words that are similar in meaning. EXAMPLE: Cat - feline.
E1-26	SYNTAX	Rules of language structure and word relations as established by usage, both written and oral.
C1-3	TACTILE PERCEPTION	Involves ability to gain meaning from tactile (kinesthetic, haptic) information. General Term.
C1-4	TACTILE CLOSURE	Ability to complete or recognize the missing part or gap when a tactile unit is incomplete.
C1-5	TACTILE DISCRIMINATION	Ability to recognize gross or fine similarities or differences between tactile stimuli.
C1-6	TACTILE FIGURE GROUND	Ability to focus on one part of a tactile configuration so it stands out clearly (figure) while the remainder forms a background.(ground)
D8-2	TABLES	(see Charts)

CODE #	TERM	DEFINITION
C1-1	TASTE PERCEPTION	(see Gustatory)
F7-8	TEMPERATURE	How to read Farenheit or Centigrade thermometer.
F7-10	TELLING TIME	Clock reading, hours, minutes, seconds, A.M., P.M.
F7-9	TIME CONCEPTS	Calendar, morning, later, days, years, seasons.
A3-7	TIME PERSPECTIVE	Ability to understand the flow or passage and the quantity of time. EXAMPLE: Was 800 A.D. very long. How much is an hour. (see Time Concept)
I5-9	TOILETING	Deals with establishing and maintaining toilet use skills and habits.
A1-12	TONE	(see Auditory Pitch)
E4-13	TONGUE EXERCISES	Aid learner in placing tongue in specific place to allow production of correct speech sound.
D1-6	TRACE	(see Copy)
E2-7	TRANSITION HANDWRITING	Deals with transfer from manuscript to cursive handwriting.
D6-23	TRUE LIFE	Stories which are fiction, but believable as an actual happening or based on actual facts.
D6-24	URBAN THEME	Stories with a city life theme.
E1-27	VERB	Teaches about action words, their meaning or use, tenses.
E4-14	VERBAL ABILITY	(see Expressive Language)
E4-15	VERBAL MEANING	Semantics, word and sentence meaning.
A2	VISUAL - COGNITIVE PROCESS	(Major Skill)
A2-1	VISUAL ACUITY	Ability to define with clarity and sharpness the characteristics of the visual stimuli.
A2-2	VISUAL ATTENTION SPAN	The length of time one is able to screen visual sensory impulses, i.e., selecting one portion of the available visual stimuli while ignoring other visual stimuli.
A2-3	VISUAL - AUDITORY INTEGRATION	Ability to organize and relate meaningful units of visual and auditory information.
A2-4	VISUAL CLOSURE	The ability to complete or recognize the missing part or gap when a visual unit is incomplete.
A2-5	VISUAL COMPREHENSION	(see Visual Perception)
A2-6	VISUAL CONSTANCY	Ability to perceive a visual unit as unchanged regardless of the variability or distortion of the stimulus.
A2-7	VISUAL DEPTH PERCEPTION	Ability to discriminate absolute and relative distances of visual stimuli at varying distances from the eye.
A2-8	VISUAL DISCRIMINATION	Ability to recognize gross or fine similarities or differences between visual stimuli.
A2-9	VISUAL FIGURE GROUND	Ability to focus on one part of a visual configuration so it stands out clearly (figure) while the remainder forms a background(ground).
A2-10	VISUAL IMAGE	Ability to remember visual stimuli after the stimuli have been removed. (See Visual Memory).
A2-11	VISUAL MEMORY	Requires retaining, recalling, and/or recognizing previously learned or experienced visual stimuli.
A2-12	VISUAL MOTOR INTEGRATION	Requires ability to reproduce by motor means information that is perceived through visual stimuli.
A2-13	VISUAL PERCEPTION	Provides exercises in visual discrimination, memory, sequencing, reception, recognition, identification; ability to gain meaning from visual information. General Term.

CODE #	ITEM	DEFINITION
A2-13	VISUAL PURSUIT	(see Visual Tracking)
A2-14	VISUAL SEQUENCING	Requires organization of visual stimuli into a desired order.
A2-15	VISUAL TRACKING, PURSUIT	Trains eye movement to follow movement of objects or to move across lines with a smooth motion of the eye with the head held in a stationary position.
D4-23	VOCABULARY, SIGHT WORDS	Increases learner's speaking and/or comprehending vocabulary.
X2	VOCATIONAL	Deals with development of specific saleable skills. (Major Skill)
D2-22	VOICELESS SOUNDS	Deals with voiceless sounds. EXAMPLE: p as opposed to b.
A1-12	VOLUME	(see Auditory Pitch)
D2-23	VOWELS	Deals with vowels and their function.
D2-24	VOWEL (Initial)	Deals with initial vowels. EXAMPLE: egg, add
D2-25	VOWEL (Irregular, Double)	Deals with phonetic elements such as oo in snow, oo in rooster, oo in book, au in auto.
D2-26	VOWEL (Long)	Deals with long vowels, ā,ē,ī,ō,ū,ȳ
D2-27	VOWEL (Medial)	Deals with medial vowels. EXAMPLE: Cat, fat
D2-28	VOWEL (Regular Double)	Deals with the following vowel combinations; ai, oa, ay, ea, ee, ie, oo.
D2-29	VOWEL (Short)	Deals with short vowels, a, e, i, o , u, y
D2-30	VOWEL VARIANTS	Deals with vowels when combined with r, l, w
D2-24	WORD ATTACK OR RECOGNITION EXERCISES	Deals with various methods of word attack such as phonetic skills, configuration clues, context clues, structural analysis, etc. General Term
D4-25	WORD ENDINGS	Deals with word endings. EXAMPLE: ing, ed, s
D4-26	WORD FAMILIES, PATTERNS	Develops vocabulary through word patterns or families. EXAMPLE: pin, pan, pen.
D4-27	WORD MEANING EXERCISES	Deals with the meaning or definition of a word.
E1-28	WORD ORIGIN	Deals with the historical origin of words.
D4-26	WORD PATTERNS	(see Word Families)
D4-28	WORD PICTURE MATCHING	Requires learner to match picture stimulus to correct word.
D4-24	WORD RECOGNITION	(see Word Attack)
D6-7	WORK HABITS	Contains information or exercises to aid in developing good study work habits.

SAMPLE ANALYSIS SHEET

Office Use: I ☐ C ☐

Type: D M T S

Analyst's School_____

Title, Number, Author:

Publisher, Date:

*Specific Descriptors:

Code Numbers

*Major Area, Major Skill:

*Instructional Level:_____ P K 1 2 3 4 5 6 7 8 9

*Interest Level:_____ 1 2 3 4 5

*Format:
Contents_____

Additional Equipment:

*Input Mode: 1) Auditory 2) Visual 3) Tactile 4) Auditory-Visual
5) Visual-Tactile 6) Auditory-Tactile

*Output Mode: 1) Verbal 2) Non-verbal_____

*Teacher/Learner Interaction:
Learners:_____.

Independent	Teacher directed
1)large group	4)large group
2)small group	5)small group
3)individual	6)individual

Time:

Objective:

Entering Tasks:

Summary:

Directions and Sketch for 'S':
Caution:

Follow Up:

*Coded for Retrieval - Use MARS Coding Guide

Analysis Sheet
MARS - Revised
6-73

This is the analysis sheet used for recording the pertinent information about a resource. A statement from each of the following categories in this workbook is entered on this form to complete an analysis of an educational resource for inclusion on a MARS retrieval card.

Continued to next page for first selection.

APPENDIX B

MARS Programmed Workbook for the

Analysis of Educational Resources

MEDIA ANALYSIS AND RETRIEVAL SYSTEM

Programmed Workbook for Analysis of Educational Resources

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Carolyn Rude, Technology Coordinator, 114 Second Avenue, Coralville, Iowa 52241; Phone 319/351-4361; July 10, 1973.

Office Use: I ☐ C ☐

Type: D M T S

Analyst's School_____

Title, Number, Author:

Publisher, Date:

*Specific Descriptors:

Code Numbers

___ - __

*Major Area, Major Skill:

*Instructional Level:_____ P P K 1 2 3 4 5 6 7 8 9

*Interest Level:_____ 1 2 3 4 5

*Format:

Contents_____

Additional Equipment:

*Input Mode: 1) Auditory 2) Visual 3) Tactile 4) Auditory-Visual
5) Visual-Tactile 6) Auditory-Tactile

*Output Mode: 1) Verbal 2) Non-verbal_____

*Teacher/Learner Interaction:

Learners:_____.

Independent	Teacher directed
1)large group	4)large group
2)small group	5)small group
3)individual	6)individual

Time:

Objective:

Entering Tasks:

Summary:

Directions and Sketch for 'S':

Caution:

Follow Up:

Analysis Sheet
MARS - Revised 6-73

*Coded for Retrieval - Use MARS Coding Guide

PROGRAMMED WORKBOOK FOR ANALYSIS OF EDUCATIONAL RESOURCES

INTRODUCTION

If you are working with children in an elementary school you are probably using educational resources in some fashion at some time during each day. The purpose of the Programmed Workbook is to guide you through a method of looking at the skills and abilities these resources are helping to teach and how they may do it. With a structure in mind you can look at any resource and more effectively decide if and how it will fit into your curriculum, the set up of your room, your teaching style, etc., for enhancing the learning of the children you teach.

With a good understanding of the makeup of each educational resource, you can more effectively plan for its use in the diagnostic and treatment activities you devise for individualizing the instruction of educationally handicapped children in the classroom.

INSTRUCTIONS

This Programmed Workbook is presented in 18 sections which correspond with the categories on the Analysis Sheet. You will learn how to complete each section to analyze a resource. Each of the 18 sections of the workbook has an explanation, purpose, sometimes descriptor terms and code numbers, and an example. This is followed by questions which can be answered from that information. The answers for the questions are given on the following page. To use this workbook you need:

1. MARS CODING GUIDE
2. MARS ANALYSIS SHEET
3. One piece of educational material designed for reading or math skills, kindergarten thru grade 3.
4. Publisher's catalog or brochures (optional)

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TYPE OF ITEM

See Analysis Sheet.

This section describes the type of educational resource to be analyzed. Those types included in MARS are:

D - Diagnostic Instruments

M - Educational Material

T - Teacher Resources

S - Strategies

Read MARS CODING GUIDE, page 1, for definition of these terms.

At the present time, MARS mainly contains resources for reading and math for the kindergarten through grade 3 levels. Throughout the rest of the Workbook, Educational Materials will be used as the type of resource analyzed. The other types of resources would be analyzed in approximately the same way.

Type: D (M) T S

This is a child-use educational material, commercially produced.

EXAMPLE: Here is an example of analysis for Type of Item:

The next two pages contain questions which can be answered from the information you have just read.

TYPE OF ITEM - Questions

Circle D M T or S to indicate the type of item.

1. Amanda and Tom Short

   TYPE: D M T S

   414 Second Avenue

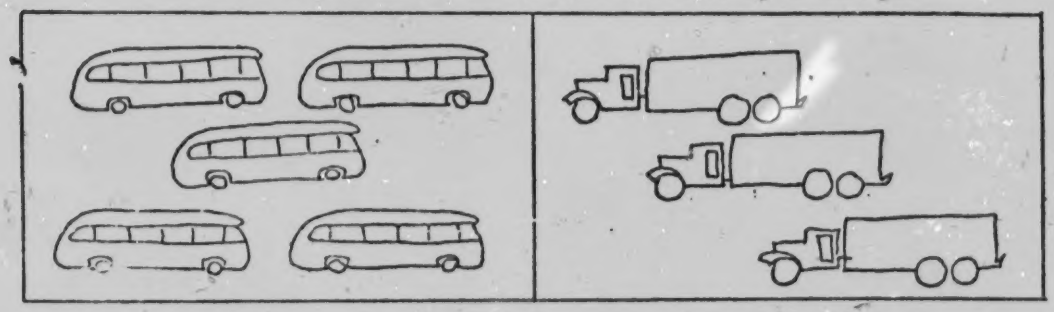
   Phone - 351-4361

   Both are active in community theatre and specialize in pantomime. They work well with third, fourth and fifth graders to present principles of dramatics and to develop short presentations. Contact after 5 p.m.

2. DIAGNOSTIC MATH TEST

   TYPE: D M T S

   "In each row put an X on the box that has less things."



3. Treatment Strategy or Prescription for Jimmy Smith

   TYPE: D M T S

   Specific Skill: initial consonants

   Instructional Level: Second grade

   Objective:

   Activities:

   Evaluation:

Continue to next page.

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4. TYPE: D M T S

NUMBER CONCEPTS

The arithmetic section emphasizes understanding of basic arithmetic and measurement concepts and computational skills.

To effectively utilize these materials, the teacher must provide opportunities for manipulation of objects, physical movement, and other concrete experiences.

As with the other section, items are pr
level of complexity and the major concep
order of the items is as follows:

Numeral and number group identificatio
Formation of
Recognition
One-to-one c
Counting and
Simple comp

avaril wedemeyer · joyce cejka

creative ideas for teaching exceptional children

5. Mrs. Jones, Potts Elementary, has been TYPE: D M T S using a technique to reinforce the review of spelling words. She made a football field chart and puts on plastic footballs to indicate individual progress. It has worked very well as a motivator. She wants to share this idea with other teachers in other schools by writing up the objective, directions for making and using it and a sketch. She wants teachers in her school to know her duplicate set is available for use.

Answers to these questions on next page.

TYPE OF ITEM - Answers

1. D M (T) S

   Human resources to the teacher - community people with an important skill who can be called upon for aid.

2. (D) M T S

   Use to assess skills in a diagnostic situation with a group or individual.

3. D M T (S)

   A strategy or prescription for teaching certain skills or abilities to a specific learner or a group.

4. D M (T) S

   Nonhuman resources for use by the teacher - commercial material suggesting ideas for use in instruction. Read the title and information for clues. It gives "Ideas for teaching."

5. D (M) T (S)

   When the idea is written up to share with others, it is coded as (S). If the item has actually been constructed by a teacher or other personnel and is available for use in the school, it is a teacher made material and coded (M). If the material is constructed from information on a MARS card and both the material and information are available in the school, it is coded both ways.

Continue to next section.

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TITLE, NUMBER, AUTHOR
PUBLISHER, COPYRIGHT DATE

See Analysis Sheet.

This section describes the procedure for specific identification of an item. Correct entry of this information is very important for matching the Media Inventory listings from an elementary building with the correct material and the correct analysis. The title, number, author and publisher, date on the analysis is written in the same manner as on the inventory and may be transferred directly from it. Write the title in capital letters.

Below is an example of the Inventory Form with directions for entry of information. This same information is entered on the analysis in the same sequence.

EXAMPLE:

MARS
MEDIA INVENTORY

1. Title words which apply specifically to only that item, in capital letters.
2. Any of the terms "Grade", "Part", "Level", "Book" which appear on the material. List in the order in which they appear.
3. Any of the terms "Activity Book", "Exercise Book", etc., if part of the title.
4. Publisher's Number which is printed on or with the material or which appears in the publisher's catalog.
5. Series Name, if applies.
6. Author, if applies.
7. Exact name of Publisher, producer or distributor who printed or produced the material.
8. Last copyright date given on the material.

Title (1, 2, 3)	Number (4)	Series (5)	Author (6)	Publisher (7)	Date (8)
WHAT THE LETTERS SAY	#2300	Phonics Game Series	Dolch, Edward W.	Garrard Press	1955

When this information is written on the Analysis Sheet, it will look like this:

Title, Number: WHAT THE LETTERS SAY, #2300, Phonics Game Series
Author: Dolch, Edward W.
Publisher, Date: Garrard Press, 1955

The next 2 pages contain questions which can be answered from the information you have just read.

TITLE, NUMBER, AUTHOR/PUBLISHER, COPYRIGHT DATE - Questions

Fill in the information as it should look on the analysis sheet.

1. Title, Number, Author:

No. 9504 Fractions Are Easy As Pie®

A learning game for fractional parts. Actually two games in one, the first shows the difference in sizes of fractional parts. The second helps older children learn to add fractions. Colorful spinner with metal arrow.

Price $1.25

Publisher, Copyright Date:

2. Title, Number, Author:

Arithmetic Quizmo®

Educational Lotto for valuable practice in number combinations. Each set gives double learning value and contains cards for the entire class.

No. 9309 — Add-Subtract Price $2.25
No. 9310 — Multiply-Divide 2.25

Publisher, Copyright Date:

Title, Number, Author:

Publisher, Copyright Date:

Continue to next page.

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TITLE, NUMBER, AUTHOR/PUBLISHER, COPYRIGHT DATE - Questions

No. 7642 Mathfacts Games T.M.

A chest of 5 self-instructional, self-checking games that deal with the learning of basic addition and subtraction number facts. Each of these pupil centered games covers a different set of facts and is graded in levels of increasing complexity. They're designed to provide small group drill with basic number facts but may also be played solitaire by the individual student. Instructions for varied play strategies are included. For grades 1 to 3 and remedial use beyond. The Games Chest includes these 5 game concepts graded as follows:

level 1 Addition Facts — Sums less Than Ten
level 2 Subtraction Facts — Known Sums Less Than Ten
level 3 Addition Facts — Sums From Ten to Eighteen
level 4 Subtraction Facts — Known Sums From Ten to Eighteen
level 5 Addition & Subtraction: Unknown Addends, Unknown Sums.

Price $15.00

3. Title, Number, Author:
   Publisher, Copyright Date:

   _____

   Title, Number, Author:
   Publisher, Copyright Date:

   _____

   Title, Number, Author:
   Publisher, Copyright Date:

   _____

   Title, Number, Author:
   Publisher, Copyright Date:

   _____

   Title, Number, Author:
   Publisher, Copyright Date:

   _____

Answers to these questions on next page.

TITLE, NUMBER, AUTHOR/PUBLISHER, COPYRIGHT DATE - Answers

1. Title: FRACTIONS ARE EASY AS PIE #9504
   Publisher: Milton Bradley

2. Title: ADD - SUBTRACT #9309 - Arithmetic Quizmo
   Publisher: Milton Bradley

   Titie: MULTIPLY - DIVIDE #9310 - Arithmetic Quizmo
   Publisher: Milton Bradley

3. Title: ADDITION FACTS - Sums less than ten - Level 1, #7642- Mathfacts Games.
   Publisher: Milton Bradley

   Title: SUBTRACTION FACTS - Known sums less than ten - Level 2, #7642 - Mathfacts Games.
   Publisher: Milton Bradley

   Title: ADDITION FACTS - Sums from ten to eighteen, Level 3, #7642 - Mathfacts Games.
   Publisher: Milton Bradley

   Title: SUBTRACTION FACTS - Known sums from ten to eighteen, Level 4, #7642 - Mathfacts Games.
   Publisher: Milton Bradley

   Title: ADDITION AND SUBTRACTION, Unknown addends, unknown sums, Level 5, #7642 - Mathfacts Games.
   Publisher: Milton Bradley

Continue to next section.

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SPECIFIC DESCRIPTORS

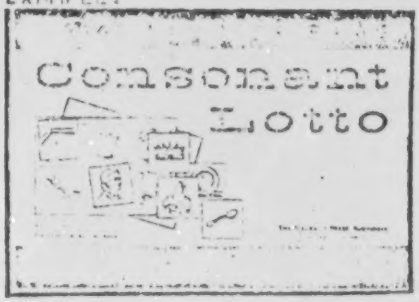
See Analysis Sheet.

In this section the material is described in terms of the specific abilities and curriculum skills for which it is designed to be used.

See the MARS Coding Guide for the terms and code numbers to be used. Spend some time studying the terms which are grouped by content areas on pages 3 to 11 and are listed alphabetically with definitions on pages 15 to 20.

The following is an example of analyzing a material for specific descriptors.

EXAMPLE:



CONSONANT LOTTO: This game teaches the first step in sounding, learning to hear the consonants that begin most words. Game played for fun, but teaches fundamental step in phonics. Grades 1 and up. 2304 $1.98

This is the box lid and de-criptive information from the catalog. The box lid mentions consonants and consonant blends. The catalog paragraph states - to "hear the consonants that begin most words." Putting these two pieces of information together and knowing the material, match it to the closest terms and numbers in the Coding Guide.

Specific Descriptors:	Consonant (Initial)	Code Numbers:
	Blend (Initial)	D2-2
		D2-4

Analysis for specific descriptors is not always easy. The material must be described as specifically as possible and all appropriate terms listed. When considering assigning a Specific Descriptor to a material the determining question should be "When I am retrieving for this specific descriptor, is this a material that would be appropriate to consider - would I want to retrieve and use this material?"

The next 4 pages contain questions which can be answered from the information you have just read.

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SPECIFIC DESCRIPTORS - Questions

Using the Coding Guide, list the appropriate Specific Descriptor Terms and Code Numbers to describe the material.

Content Academic - Reading/Readiness

1.

No. 7823
Pictures That Rhyme Flannel Aid

Pictures That Rhyme — designed to develop ability in recognizing rhyming words and identifying objects. 21 sets of pictures, 3 pictures per set. 63 cards printed in four colors. 2⅞" x 4¼". Plastic tray for matching and storing. Price $3.25

Specific Descriptors:

Code Numbers:

2.

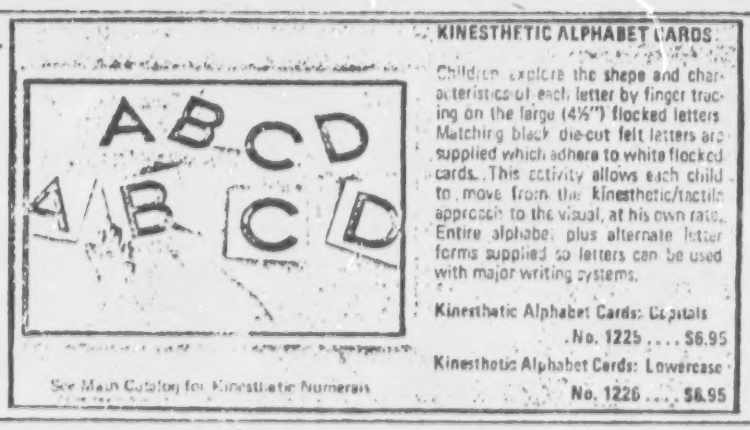
No. 7821
Color Recognition Flannel-Board Kit

The kit contains felt pieces in primary and secondary colors and basic geometrical shapes. Cards with names of colors and words: Stop, Go, Caution. 8 large die-cut felt sheets, 12 word cards. Booklet of activities included.
Grades Kindergarten and primary. Price $2.50

Specific Descriptors:

Code Numbers:

3.



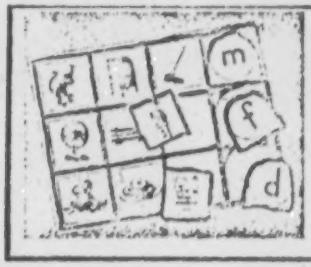
Specific Descriptors:

Code Numbers:

Continue to next page.

Content Academic - Reading Phonics

4.



***MATCH-THE-SOUNDS PUZZLES**

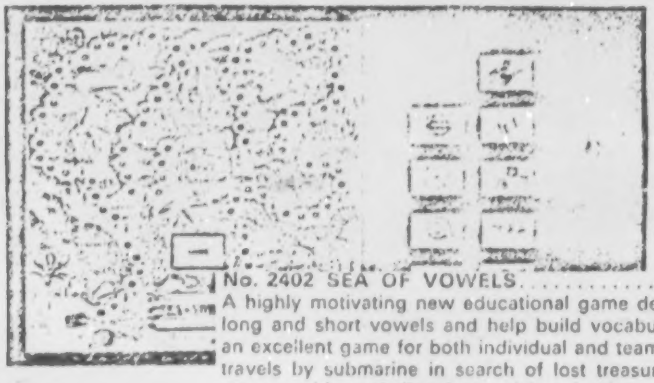
Additional practice in visual and auditory discrimination of initial consonants. Child matches color-coded picture and letter cards with groupings illustrated on each puzzle. 8 full-color puzzle cards, 8½" x 11". 48 color-coded inset cards.

No. 1405 . . . . $6.95

Specific Descriptors:

Code Numbers:

5.



No. 2402 SEA OF VOWELS $6.75

A highly motivating new educational game designed to teach long and short vowels and help build vocabulary. It provides an excellent game for both individual and team play. The child travels by submarine in search of lost treasure, encountering many exciting, challenging and imaginative adventures along the way. The game stimulates the child's interest in vowels and and encourages group participation. Two to six players are recommended.

Specific Descriptors:

Code Numbers:

6.

WORD PREFIXES This set of cards presents 22 different prefixes blended to form 216 words. The meaning of each prefix is given, and the words being shown are keyed on back of each card. Unique in its construction and easy to manipulate.

No. 1202 — Per Set . . . . . 85 cents

Specific Descriptors:

Continue to next page.

SPECIFIC DESCRIPTORS - Questions

Content Academic - Mathematics/Numeration

7.

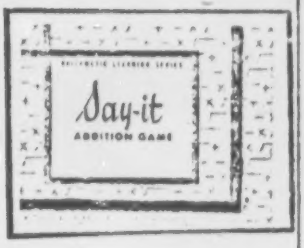
FIRST ARITHMETIC GAME: Children learn to count all sorts of familiar objects, and by repetition, gain a better knowledge of beginning arithmetic concepts. K-1.
2404 $2.50

Specific Descriptors:

Code Numbers:

Content Academic - Mathematics/Addition

8.



***Say-It* GAMES:** These four games teach the basic combinations in addition, subtraction, multiplication, and division. Played like Bingo or Lotto. All grades.

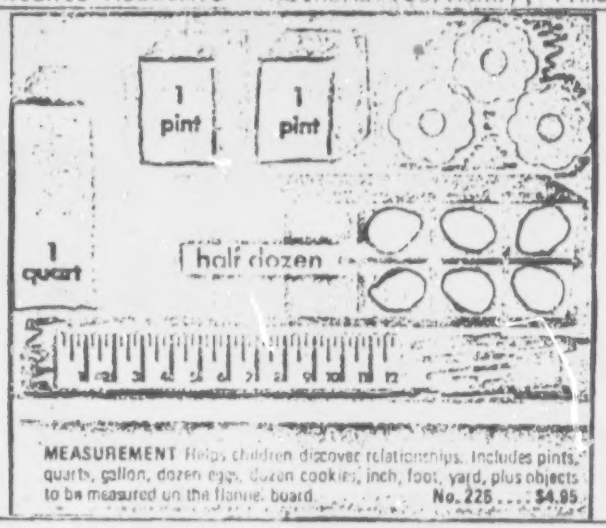
Say-It Addition	2400	$2.50
Say-It Subtraction	2401	$2.50
Say-It Multiplication	2402	$2.50
Say-It Division	2403	$2.50
Complete Set, all four games	2480	$10.00

Specific Descriptors:

Code Numbers

Contents Academic - Mathematics/Money, Time, Measurement, Geometry

9.



MEASUREMENT Helps children discover relationships. Includes pints, quarts, gallon, dozen eggs, dozen cookies, inch, foot, yard, plus objects to be measured on the flanne. board. **No. 225 . . . . $4.95**

Specific Descriptors:

Code Numbers:

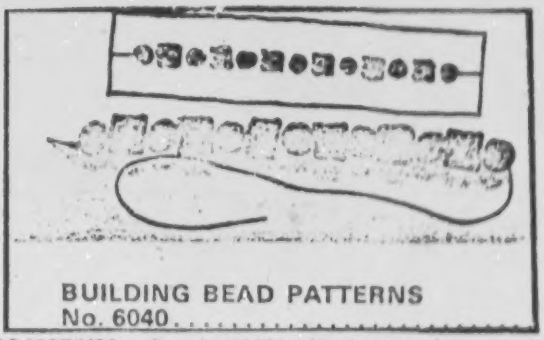
Continue to next page.

Process - Cognitive/Visual

10.

Specific Descriptors:

Code Numbers:



BUILDING BEAD PATTERNS
No. 6040.....

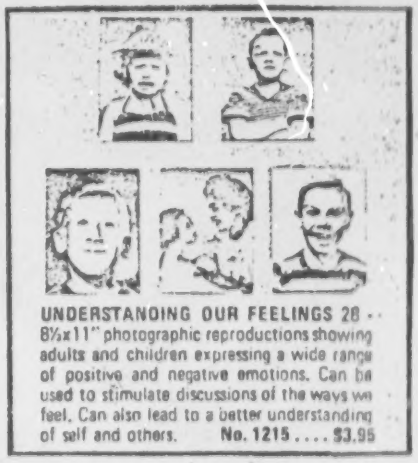
OBJECTIVES:
- Develop skill in visual perception.
- Develop skill in tactile awareness.
- Develop skill in fine motor coordination.
- Develop skill in sequential arrangement.
- Develop skill in left to right progression.
- Develop skill in visual memory and recall.

Process - Affective

11.

Specific Descriptors:

Code Numbers:



UNDERSTANDING OUR FEELINGS 28 - 8½x11" photographic reproductions showing adults and children expressing a wide range of positive and negative emotions. Can be used to stimulate discussions of the ways we feel. Can also lead to a better understanding of self and others. **No. 1215 .... $3.95**

Answers to these questions on next page.

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SPECIFIC DESCRIPTORS - Answers

1. Specific Descriptors: Rhymes Coding Guide - page 4	Code Numbers: D1-18
2. Specific Descriptors: Color Concepts Color Words Geometric Shapes Coding Guide - page 4, 5, 8	Code Numbers: D1-3 D5-3 F7-3
3. Specific Descriptors: Alphabet Coding Guide - page 4	Code Numbers: D1-1
4. Specific Descriptors: Consonant (Initial) Coding Guide - page 4	Code Numbers: D2-4
5. Specific Descriptors: Vowel (Long) Vowel (Short) Coding Guide - page 4	Code Numbers: D2-17 D2-19

Continue to next page.

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	Specific Descriptors:	Code Numbers:
6.	Prefix	D4-7
	Coding Guide - page 4	
7.	Specific Descriptors:	Code Numbers:
	Counting	F1-3
	Numeral recognition	F1-8
	Number words	F1-10
	Coding Guide - page 7	
8.	Specific Descriptors:	Code Numbers:
	Addition Facts	F2-2
	Coding Guide - page 7	
9.	Specific Descriptors:	Code Numbers:
	Nongeometric Measurement	F7-8
	Coding Guide - page 8	
10.	Specific Descriptors:	Code Numbers:
	Visual Perception	A2-10
	Tactile Perception	A5-5
	Fine Motor Coordination	I2-4
	Visual Sequential Memory	A2-11
	Left to Right Progression	D1-12
	Coding Guide - page 3, 4, 8	
11.	Specific Descriptors:	Code Numbers:
	Feelings	B1-5
	Coding Guide - page 3	

Continue to next section.

MAJOR AREA, MAJOR SKILL

See Analysis Sheet.

Of those Specific Descriptor terms you have selected for a material, decide which grouping of terms is the most important, representative, and/or predominant. Select one and list that as the Major Area and Skill. These terms are listed in the MARS Coding Guide, page 2. See also the Specific Descriptor breakdowns of these grouping in the Coding Guide, pages 3 to 8.

Here is an example of the use of the Major Area, Major Skill group on an analysis.

EXAMPLE:

		Code Numbers:
Title: BEAD ABACUS		
Publisher: Judy Co.		F1-6*
Specific Descriptors:	place value, numbers, carrying, borrowing	F1-13* F2-10
Major Area/Major Skill:	Math - Numeration	F3-1

Looking at the code numbers and specific descriptors, the material works mainly on skills in the Math-Numeration (F1-) group. (Two code numbers are from the F1- group, one from F2- addition, and one from F3- subtraction.) The entry on the analysis sheet indicates Math - Numeration as the Major Area/Major Skill.

The code numbers for the selected Major Area, Major Skill and Specific Descriptors (F1-6, F1-13) are starred for later use in grooving the retrieval card and for the Crossreference Cards.

The next page contains questions which can be answered from the information you have just read.

MAJOR AREA, MAJOR SKILL - Questions

Enter the appropriate terms for Major Area, Major Skill and star the corresponding Code Numbers.

1. Title: LONG AND SHORT VOWELS #49

   Publisher: Instructo, 1968

   Specific Descriptors:

   Vowel (short), vowel (long), word patterns

   Major Area, Major Skill: _____

   Code Numbers:
   D2-19
   D2-17
   D5-14

2. Title: LOCATION: SHORT VOWEL U #0218

   Publisher: Wollensak/3M Co., 1968

   Specific Descriptors.

   Vowel (initial), vowel (medial), vowel (short), sound/symbol relationship

   Major Area, Major Skill: _____

   Code Numbers:
   D2-15
   D2-18
   D2-19
   D2-14

3. Title: TWO-DIMENSIONAL COLOR BLOCK DESIGN #6002

   Publisher: Ideal School Supply Co.

   Specific Descriptors:

   Visual discrimination, designs, color concepts

   Major Area, Major Skill: _____

   Code Numbers:
   A2-6
   D1-6
   D1-3

4. Title: BASIC SIGHT WORDS: SERVICE WORDS

   Publisher: Psychotechnics, Inc.

   Specific Descriptors:

   Visual sequential memory, visual tracking, vocabulary and sight words.

   Major Area, Major Skill: _____

   Code Numbers:
   A2-11
   A2-12
   D5-13

Answers to these questions on next page.

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MAJOR AREA, MAJOR SKILL - Answers

1. Major Area, Major Skill - Reading - Phonics

The most important group of skills is indicated and starred.

Coding Guide, page 4.

Code Numbers:
D2-19*
D2-17*
D5-14

2. Major Area, Major Skill - Reading - Phonics

All are starred since they are in the same skill group.

Coding Guide, page 4.

Code Numbers:
D2-15*
D2-18*
D2-19*
D2-14*

3. Major Area, Major Skill: Reading - Readiness

The code numbers not starred will not be grooved on the retrieval card for this analysis. The material title and code number will be entered on a crossreference card which refers back to the original analysis.

Coding Guide, page 4.

Code Numbers:
A2-6
D1-6*
D1-3*

4. Major Area, Major Skill: Reading-Vocabulary Development

The starred code number indicates the major emphasis of the material, although there is a higher proportion of code numbers from another skill grouping.

Coding Guide, page 4.

Code Numbers:
A2-12
A2-11
D5-13*

Continue to next section.

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INSTRUCTIONAL LEVEL/INTEREST LEVEL

See Analysis Sheet.

This section describes the instructional level at which the material was designed to be used as stated on the material. This is to give a level of difficulty or complexity. If it is not stated, check scope and sequence charts, etc., to find the level at which the abilities, skills, information presented usually are taught. This is important to note so that the level of complexity of the presented information will be appropriate. See Coding Guide, p. 12, for instructional level descriptors. The appropriate term and code number are entered on the Analysis Sheet.

The interest level or motivational factor should also be considered in analysis. Sometimes a material presents specific skills and abilities usually taught at a lower instructional level through a format designed for older learners. The design could give the appearance of a higher grade level material through smaller print and spacing on the page, more mature children in the pictures, more mature or motivating topics. Consider what chronological age or grade level of learner it would interest.

See Coding Guide, p. 12, for interest level descriptors. If the interest level is stated on the material apply that to the code terms. If not stated, devise one or enter "NA" not applicable if it is too difficult to state. Enter term and code number on Analysis.

An example of the entry of Instructional Level and Interest Level would be this High Interest/Low Vocabulary material.

GRADE LEVEL: While the reading level is about third grade, the content interests young people from elementary through high school. The books are heavily boy-oriented since the largest percentage of most remedial or disabled reading groups is boys. However the subject matter has proved to be of great interest to girls as well. as well.

Instructional Level:

Third Grade (3)

Interest Level:

Elementary to high school (3,4,5)

The next page contains questions which can be answered from the information you have just read.

INSTRUCTIONAL LEVEL/INTEREST LEVEL - Questions

Use the Coding Guide to answer these questions.

1. The description for Educational Toy Money states that it is for use in nursery, kindergarten, and primary grades for number practice and making change.

   Instructional Level: _____

   Interest Level: _____

2. A set of flash cards on addition facts does not give an instructional level.

   Instructional Level: _____

   Interest Level: _____

3. Picture Sequence Cards are described as a reading readiness activity appropriate for primary grades.

   Instructional Level: _____

   Interest Level: _____

4.

KEY:
calculated reading level
interest level

   Instructional Level: _____

   Interest Level: _____

Answers to these questions on next page.

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INSTRUCTIONAL LEVEL/INTEREST LEVEL - Answers

1. Instructional Level: Preschool, Kindergarten, primary grades (P-3)

   Interest Level: Preschool, Primary, Intermediate (1,2,3)

2. Instructional Level: Grades 1, 2 (1,2)

   Interest Level: NA

   Flash cards for memorization of addition facts aré generally used at this instructional level. An interest level is difficult to state for this type of format. If your experience proves differently, state it accordingly.

3. Instructional Level: Kindergarten, Grades 1, 2 (K,1,2)

   Interest Level: Primary (2)

   Looking at the title and reading the description of reading readiness should lead you to the above coding.

4. Instructional Level: 2 8 (2)

   Interest Level: Primary (2)

Continue to next section.

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FORMAT

See Analysis Sheet.

This section describes the physical form or design of the material. The format is important because it tells how the information is packaged for presentation to the learner. The teacher may make format decisions based on available hardware or purpose of use. Format may also be influenced by the Input Mode and Output Mode discussed later.

The type of formats included in MARS are listed on page 12 of the Coding Guide.

Use as many of the descriptors as needed, trying to match to the most appropriate term. If these descriptors do not indicate the format adequately, list the needed term on your analysis without a code number.

For contents describe what is included, how many of each thing, does it have a teacher's guide, is it boxed, etc., as needed.

EXAMPLE:

No. 2721 CONSONANT PICTURES FOR PEG BOARD..... $3.50
179 pictures in color and 30 consonant symbols printed on 3¾" x 4" cards for use on peg board, chalk tray, or as flash cards. To aid in teaching and drilling initial and final sounds and their symbols.

Format: Card (7)

Content: 179 pictures in color and 30 consonant symbols printed on 3 3/4" x 4" cards.

The next page contains questions which can be answered from the information you have just read.

FORMAT - Questions

Use the Coding Guide to enter terms and numbers. Write contents from information given.

1. This audio program "is a correlated, sequential program of 600 oral/aural/visual instructional cards which are arranged into 3 sets of 200 cards each. Each card is pre recorded and printed with both written and pictorial material."

   Format: _____

   Contents: _____

2. Picture Word Builders includes pictures of 36 familiar objects printed on heavy cardstock. The name of the object in large print is indicated on each. Every card has a cut out section on which the name is duplicated. Cards are die cut so that only the proper name may be inserted to fit and complete the word and picture matching. Attractively boxed.

   Format: _____

   Contents: _____

3. Quizmo is so designed that each set is really 2 sets in one, for example, addition may be used separately from subtraction. Each set contains 39 game cards printed on both sides, 120 quiz cards, (which can be used as flashcards alone if desired) and a generous supply of markers. Played like Lotto game. Easy to read directions included.

   Format: _____

   Contents: _____

Continue to next page.

4. Arithmesticks is designed to serve as a basic aid in developing mathematical ideas. Single stick with 10 beads on it is an ideal counter and number fact builder. Joined together, sticks make number panels, abacus, per cent panel, other manipulative aids. Ten sticks to a box with 100 beads, instructor's manual.

   Format: _____

   Contents: _____

Answers to these questions can be found on the next page.

FORMAT - Answers

1. Format: Audio card (1)

   Contents: 600 audio cards arranged into 3 sets of 200. Each card is pre recorded and printed with written and pictorial material.

2. Format: Card, large print (7,17)

   Contents: 36 pictures of familiar objects with name of each and a die cut section with same name. Only the correct name piece fits into the card.

3. Format: Game (15)

   Contents: 39 games cards printed on both sides, 120 cards, markers, directions.

4. Format: Manipulative objects (22)

   Contents: 10 sticks to a box with 100 beads total, instructor's manual.

Continue to next section.

ADDITIONAL EQUIPMENT

See Analysis Sheet.

This section describes the type of additional equipment or machine needed to use the resource and not included with it. This is important to note because it is often possible to start using a resource only to discover that additional equipment is needed, which may or may not be available. The type of additional equipment needed is dictated by the format of the material. For example, to use a cassette tape one must have a cassette tape player. In the example given for Format on page 25, to use Consonant Pictures for Pegboard most appropriately, a peg board is needed.

Here is a listing of some types of additional equipment which may be called for. List others on the analysis sheet as needed.

EXAMPLE:

Audio card reader
Cassette tape player
Film projector (Super 8, 16 35mm, cartridge)
Filmloop projector
Filmstrip projector
Filmstrip previewer
Flannelboard
Headset
Overhead projector
Record player
Reel to reel tape player
Screen
Slide projector
Sound filmstrip projector
Videotape equipment, viewer

Such items as grease pencil, acetate sheet, etc., may be listed. If no additional equipment is needed, indicate this.

The next page contains questions which can be answered from information you have just read.

ADDITIONAL EQUIPMENT - Questions

Enter equipment needed.

1. Analysis of the format indicated that information is presented through 12 records.

   Additional Equipment: _____

2. Format: Reel to reel tape, 3 worksheet masters, Teacher's Guide, answer key. (4,25)

   Additional Equipment: _____

3. Format: A set containing 5 sequences of 6 cards each. (7)

   Additional Equipment: _____

4. Format: Ten books, color filmstrip, 33 1/3 rpm record, Teacher's Guide. (6,13,2)

   Additional Equipment: _____

Answers to these questions on next page.

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ADDITIONAL EQUIPMENT - Answers

1. Additional Equipment: Record player

2. Additional Equipment: Reel to reel tape player, duplicating machine.

3. Additional Equipment: None

4. Additional Equipment: Filmstrip previewer or projector record player.

Continue to next section..

INPUT MODE

See Analysis Sheet.

This area explains the sensory channel through which the learner receives information from the material. Input Mode is directly related to Format in that a material design which presents the information through sound, such as a record or tape, would require the learner to take in the information auditorily--auditory input. Do not confuse Input with Output or response Mode. Distinguish in your mind which is which.

In retrieval, the type of input mode and consequently the format selected would be influenced by any diagnosed strengths or weaknesses the learner displays in his sensory channels. In analysis, you should state the one or more sensory channels the learner would need to use to obtain the information from the material.

State the term and Code Number as shown in the Coding Guide, page 13.

1. Auditory

2. Visual

3. Tactile (tactile, haptic, kinesthetic)

4. Auditory - Visual (simultaneous)

5. Visual - Tactile (simultaneous)

6. Auditory - Tactile (simultaneous)

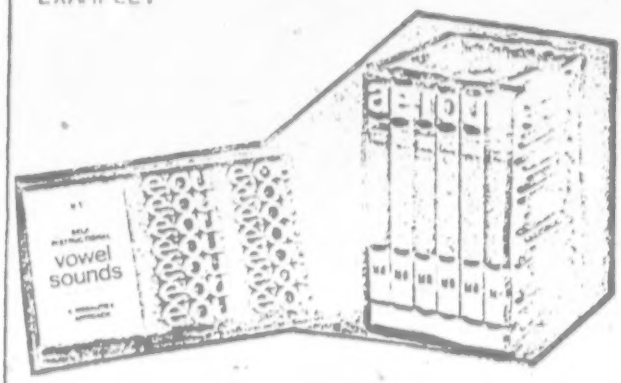
Continue to next page.

INPUT MODE

In the analysis of a material in which the input to the learner comes from the teacher rather than directly from the material, code the type of input mode used to receive this information. However, in reading the directions you find that the teacher presents all information verbally, giving auditory input to the learner. The learner never sees the book so does not receive any visual input. The Input Mode is coded as auditory. In this case the input mode and format type do not agree. The input mode here correlates more closely with teacher/learner interaction, it is teacher directed. Remember again though to code this area as the material was designed to be used and without adaptation.

When more than one input mode is used but not simultaneously, state both separately with both numbers.

EXAMPLE:



No. 7533 Vowel Sounds/A Self-Instructional Modalities Approach

A unique, triple impression program to provide auditory, visual and kinesthetic perception of vowels and vowel-consonant combinations. Student hears vowel sounds, sees vowels in word context, and manipulates teaching aids to form meaningful words. Word development is achieved in two ways. Vowel sounds are presented with emphasis on isolated sounds of the letter in word settings. Vowels are also presented as they combine with consonants to form phonemes. Vowel-consonant combinations are further reinforced as the child writes them on the response sheet.

Program consists of ten pre-recorded lessons on cassette tapes; each lesson is approximately fifteen minutes in length. Five student manipulatives are included; each is used with two lessons. Student response sheets record the pupil's progress through each lesson. Components are five cassette tapes, five manipulative devices, and ten packs of 72 response sheets.

Input Mode: Auditory - Visual (4)

The next page contains questions which can be answered from the information you have just read.

INPUT MODE - Questions

Answer with the correct term and number from the Coding Guide.

1. "The student, therefore, is able to read, hear, and see the appropriate symbols, sounds, and sights which represent things, actions, and concepts in his daily life" as presented on the audio cards.

   Input Mode: _____

2. Kinesthetic Trace - The Letter Cards has 30 black flocked alphabet cards. Arrows indicate the direction of stroke.

   Input Mode: _____

3. Musical Multiplication presents drill on the basic facts through a record format.

   Input Mode: _____

4. Homonym Poster Cards has 30 large white cards, with 60 pairs of words.

   Input Mode: _____

Answers to these questions on next page.

1. Auditory - Visual (4)

2. Tactile, Visual, Visual - Tactile (2,3,5)

3. Auditory (1)

4. Visual (2)

Continue to next section.

OUTPUT MODE

See Analysis Sheet.

This section describes the expressive channel through which the learner responds to the information presented in the material. His expression of a response indicates that he has received the information, has performed the mental processes necessary and has mentally formulated a response which he can output through a channel or mode. This output is his physical response which we see as called for by the material. The Format type is related to the type of response the learner makes.

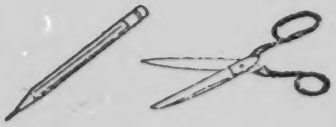
Types of output mode to record are:

1. Verbal. The response is spoken.

2. Non-verbal. The learner does one of these things:

look, listen

manipulate, work with hands



move, trace - move an object or trace with finger or pencil

mark, circle, color, cut

print, write

no specific response required.

Continue to next page.

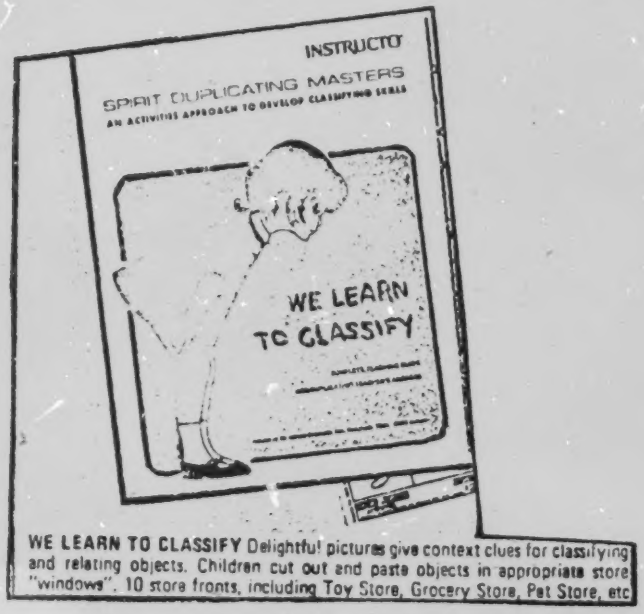
OUTPUT MODE

On the Analysis Sheet, circle non-verbal and write in the type of response indicated.

If the appropriate term is not listed, add the needed term to your analysis. See the Coding Guide, page 13, for Output Mode.

Enter the term and Code Number.

EXAMPLE:



Output Mode:
Nonverbal -
cut,
manipulate

The next page contains questions which can be answered from the information you have just read.

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OUTPUT MODE - Questions

Write the term and code number from the Coding Guide which match best.

1. In What Comes First? Next? Last?, children build stories by coloring or cutting and pasting illustrations in sequence.

   Output Mode: _____

2. My Workbook is Arithmetic has self teaching and self testing problems and exercises for the child to work at his own speed.

   Output Mode: _____

3. **MAKE A FUNNY STORY On The Flannel Board**

   Make an Eleraffel! Talk about a Kangamel! Decide whether they eat pretzels or ice cream, then tell a story about them. Contains 16 half-animals to make silly combinations, 8 places for them to live, 10 "things" to eat, many other objects for story-building.

   Output Mode: _____

Answers to these questions on next page.

OUTPUT MODE - Answers

1. Nonverbal - color, cut, manipulate (2)

2. Nonverbal - write (2)

3. Verbal, nonverbal - move (1,2)

Continue to next section.

TEACHER/LEARNER INTERACTION

See Analysis Sheet.

This section describes the interaction of the learner with the material and/or the teacher as it is stated in the material or in your opinion. You should indicate those types of interactions which are possible as the material was designed, without adaptation. Any material can be used in any way with changes. For example, a teacher directed material can be tape recorded to make it suitable for independent use. However, this material without adaptation should be analyzed as teacher directed. The possible adaptations could be included in another part of the analysis. Also, indicate the number of learners involved, as it applies.

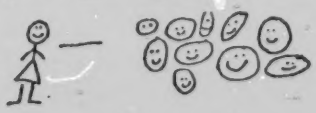
Independent - Given the directions, learner can accomplish the task without teacher's involvement.

1. Large Group - More than 6 learners and up to the total class group working together.

2. Small Group - Not more than 6 learners working together.

3. Individual - One learner working by himself.

Teacher Directed - If teacher must be directly involved in more than just giving directions and checking.

4. Large Group -  More than 6 learners and up to the total class group with teacher.

5. Small Group - Not more than 6 learners and teacher.

6. Individual - One learner and one teacher.

Continue to next page.

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See the Coding Guide, page 13. State Term and code number to indicate the type of teacher/learner interaction.

EXAMPLE:

No. 7705 BASE CHECK **$4.50**
A multiplication number game. Learning to multiply in both Base 5 and Base 10 is great fun when combined with checkers. The chips are numbered from 1 to 12 (Base 10) and from 1 to 22 (Base 5). The object of the game is to see who can obtain the highest score while jumping the opponent's checkers. Any age, 9 and up, will enjoy this exciting new game. Designed for two players.

TEACHER/LEARNER INTERACTION: Independent small group (2) 2 players.

The next page contains questions which can be answered from the information you have just read.

TEACHER/LEARNER INTERACTION - Questions

Read these statements and indicate the teacher/learner interaction.

1. This material is for use by a teacher with 40 students.

   Teacher/Learner Interaction: _____

   #Learners: _____

2. Up to 6 players can play this game.

   Teacher/Learner Interaction: _____

   #Learners: _____

3. This audio card program is amenable to various modes of operation and may be utilized on an individual, tutorial, or small group. It is essentially an autotutorial program and frees the teacher for individual work.

   Teacher/Learner Interaction: _____

   #Learners: _____

Answers to these questions on next page.

1. Teacher/Learner Interaction: Teacher directed large group (4)

   # Learners: 40

2. Teacher/Learner Interaction: Independent small group (2) - the teacher is not mentioned and most games are played independently.

   # Learners: 6

3. Teacher/Learner Interaction: Independent individual, small or large group. (1,2,3)

   # Learners: 1 to 10

Continue to next section.

TIME

See Analysis Sheet

This section describes the amount of time it will take the learner to use the material. If a time is stated in the information with the material, indicate that time. In the case of a tape or record, you can run and time it to find the amount of time for use. If there are several parts which are used separately, give a time for each.

Many materials do not state a time for use because this is dependent on such variables as the learner's skill in completing it and the situation in which it is used. Here you can state that the time for use varies with the learner's skill, conditions of use, and objectives. You may also give an estimate of approximate time based on your trial of the material.

EXAMPLE: The tape recorded story THE HAPPY PRINCE has a running time of 18 minutes. Time: 18 minutes.

The next page contains questions which can be answered from the information you have just read.

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TIME - Questions

Make an entry for each question.

1. Time - 16:54

   Time: _____

2. Have the student write the answer on the laminated card with a wax crayon or china marking crayon. When you have checked the answers, have the student wipe the surface clean.

   Time: _____

3. Tape time: 15 minutes
   Lesson time: 35 minutes

   Time: _____

Answers to questions on next page.

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1. Time: 16:54

2. Time: Varies with each learner, about 7 minutes per card.

3. Time: Tape time: 15 minutes; total lesson: 35 minutes.

Continue to next section.

OBJECTIVE

See Analysis Sheet.

This section states the purpose for which the material was designed. The objective may be taken directly from the material, if one is listed. If there is no objective given, formulate one based on knowledge of the material. State it in simple specific objective terms unless others such as behavioral objectives are available.

The objective should reflect the purpose, content, and/or structure which the material was designed to cover.

Sometimes the objectives given are not appropriate, specific, or well written. Junk objectives such as "improve good citizenship" on a simple alphabet material would be an example of an inappropriate and unsuitable objective. If an objective is not specific enough or well written, you may rewrite it to make it suitably reflect the purpose, content, and/or structure.

Be careful of usage of the terms skills and abilities. See the Specific Descriptors in the Coding Guide, pages 3-8. Abilities are listed under Process. Skills are listed under Content-Academic.

In this example, decide whether the objective is suitable:

> EXAMPLE:
>
> Material: Second Grade Rhyming Elements
>
> Objective: Given a word, learner will select a rhyming word based on the structure of the word.

Yes, this would be a suitable objective statement because it mentions what the learner will do with what information.

The next page contains questions which can be answered from the information you have just read.

OBJECTIVE - Questions

Decide whether or not these objectives are suitable. Circle answer and explain.

1. To improve reading skills.

   YES NO WHY? _____

2. To reinforce recognition of consonant letter symbols and their initial sounds in words.

   YES NO WHY? _____

3. Material: GILLINGHAM MATERIALS
   Objective: To present a technique to teach the sounds of the letters and then build these letter sounds into words through lessons in the program. See Teacher's Guide for specific objectives for each part.

   YES NO WHY? _____

4. Material: SILENT TEACHER, MULTIPLICATION #2033
   Objective: To master multiplication after basic facts are learned.

   YES NO WHY? _____

Continue to next page.

5. Material: DISCOVERING OPPOSITES #1012
Given an opposite concept board and 6 picture cards, the learner will match the cards appropriately to the board to demonstrate skill in recognizing, classifying, and discriminating opposite concepts, with 90% accuracy.

YES NO WHY? _____

_____

_____

6. Write an objective for this material.

ALPHABET MASTERY PROGRAM
Contains complementary materials to provide pre-rea
ing and reading readiness activity for the average ki
dergarten and first grade student. The program is d
signed to develop the primary student's knowledge
the alphabet. It presents the names of letters, upper and
lower case, materials for visual discrimination, left-righ
progression and letter sequencing. Each card is
on both sides for additional reinforcement informa

Objective: _____

_____

_____

_____

_____

Answers to these questions on next page.

OBJECTIVE - Answers

1. No - should be more specific in discussing purpose and structure of material.

2. Yes - it tells the purpose of the material.

3. Yes - the objective is a general one because it is for a whole program but it does mention the concept and structure of the program. It is not necessary to give all the objectives for the parts of the program but a statement mentioning their existence is good.

4. Yes - it would have been better if they would have stated which basic multiplication facts are covered.

5. Yes - this is written in behavioral terms and very specifically describes the purpose, content, and structure of the material. This complete an objective duplicates other information on the analysis which may not be desirable since an analysis should be as short and concise but complete as possible. Also the use of a 90% criterion may not be appropriate for all learners.

6. To develop the primary student's knowledge of the alphabet.

Continue to next section.

ENTERING TASKS

See Analysis Sheet.

This section describes the abilities and skills or the level of competence or achievement the learner must have attained in order to be able to begin working with the objective stated for the material. Entering Tasks lists the objectives the learner must have met immediately before he would be able to meet the stated material objective. In other words, what does he have to already know or to do in order to use this material as it is designed.

Sometimes this information with the material will list the prerequisite skills or abilities, thus saving you a lot of time. Many times, however, it will not and then the objective, specific descriptors, and material have to be analyzed for entering tasks. The statement of entering tasks often requires use of Blooms Taxonomy and task analysis procedures. Task analysis allows one to break down a task into its component parts. Blooms Taxonomy gives a structure to levels of task complexity. His most used levels are: Knowledge, memory, and application.

Sometimes the entering tasks are fairly easy to derive.

Taking the example of Combinations Are Fun #2230 - Kenworthy, the stated objective is "to drill and review 100 addition combinations with sums of 1 to 18." This objective gives the specific descriptor--addition facts with sums from 1 to 18. It also states the level of competence the learner is expected to achieve - drill and review. To be able to drill and review (memory) requires that knowledge or comprehension of the skill be attained. So the entering tasks would be "knowledge and comprehension of addition facts with sums 1 to 18."

In another example, the objective is "to provide practice in auditory memory; to recall what has been heard in correct sequence." Analysis of the material revealed that in order to respond, the learner should know concepts such as circle, first, before, different. The objective alone wouldn't lead you to the specific listing of entering tasks.

Continue to next page.

In another example, the objective "to recognize pictures whose names rhyme" would lead to a more specific analysis of the task. In order to accomplish this objective, the learner must be able to recognize the pictures, state their names, and understand and apply the concept of rhyming (entering tasks). A complete task analysis would break each of the previous skills down into their most basic components. Such specificity is not necessary for stating Entering Tasks but an understanding of Task Analysis principles would make this analysis and the use of it more relevant.

Resources for Task Analysis:

1. The Essentials of Teaching; Barbara Bateman; Dimensions Publishing Co., San Rafael, California.

2. Teaching: A Course in Applied Psychology; Becker, Englemann, Thomas; Science Research Associates.

3. Taxonomy of Educational Objectives, Handbook 1, The Cognitive Domain, Bollom, B. S.; Daniel McKay, 1956.

The next page contains questions which can be answered from the information you have just read.

ENTERING TASKS - Questions

Make an entry for each question.

1. Material: Subtraction - Primary Math Concepts, Tapes Unlimited

   Objective: To practice or reinforce basic subtraction facts with a remainder to 9.

   Entering Tasks: _____

2. Material: Vowels - Magic Cards, Ideal Co.

   Objective: To reinforce recognition of the long vowel sounds in picture words.

   Entering Tasks: _____

3. Material: Geometric Shapes in Color, Teaching Resources

   Objective: To provide experiences with shapes and forms.

   Summary: The cards are used to teach the names of colors and perception of color, as well as the specific concepts of shapes and forms and the differences between them.

   Entering Tasks: _____

4. LINGUISTIC WORD PATTERN PROGRAM

   This program in linguistics uses a structural approach to reading rather than a sound approach. The program presents materials for reinforcement in word patterns which are characterized by three basic letter sequences.

   Set I provides a major pattern in English spelling (CVC). Students are presented with a carefully ordered sequence of words that have minimum contrast, but are otherwise similar in spelling. The set also contains exercises in word discrimination.

   Set II covers the other two major patterns in English spelling, (CVC) modified by E, and (CVVC). As in Set I, materials are provided for contrast and word discrimination.

   Objective: _____

   Entering Tasks: _____

Answers to these questions on next page.

ENTERING TASKS - Answers

1. Entering Tasks: Something like - "knowledge and comprehension of subtraction facts with a remainder to 9."

2. Entering Tasks: Something like - "recognition and application of long vowel sounds; recognition of the pictures and their names."

3. Entering Tasks: Something like - "ability to visually discriminate between the colors and between shapes."

4. Objective: To reinforce word patterns which are characterized by three basic letter sequences: CVC, CVCE, CVVC.

   Entering Tasks: Instructions in CVC, CVCE, CVVC word patterns. Ability to visually discriminate word configurations, letters within words, and whole words. (See if you agree with this one.)

Continue to next section.

SUMMARY, CAUTION, FOLLOW UP

See Analysis Sheet.

The Summary, Caution, and Follow Up are presented together to show their relatedness. Each is explained separately then examples are given of the three together. There are no question and answer pages in this section.

SUMMARY

The summary is a short and concise but complete statement about what the learner must do to accomplish the lesson. It should contain some or all of the following points.

1) Procedures, directions, rules
2) Provision for individual differences - appropriate for a particular handicapping condition or learner need.
3) Active participation - what does learner do.
4) Knowledge or results - self checking
5) Opportunity for successful achievement - structured so learner is challenged yet is successfully reinforced enough to continue.
6) Practice - provides opportunities to use these newly acquired skills.
7) Rate of presentation of material. Does the rate and amount of material to be learned at any one time relate to the complexity and difficulty of the material.
8) Graduated sequencing of content - are the steps and sequence of the content too large or too small?...out of task order?

If the Teacher's Guide contains further detailed information, you may write a general summary and refer to the guide.

The purpose of the summary is to give the reader an idea of what to do with the material so as to save time and to direct users to the correct usage of the material.

CAUTION (optional)

This section explains parts of the material or presentation which might cause problems for the teacher or the learner in use. An example of a problem situation could be excessive length of a taped lesson for the stated grade level. For instance, a taped lesson in math for first grade level is 30 minutes long. From your knowledge of a first grader's attention span, this would probably be too long. Suggestions for solution of the problem could be given. Another instance would be a format which should not be used with a certain type of handicapping condition. Such as - an audio tape probably shouldn't be used with deaf learners without some adaptation.

Continue to next page.

FOLLOW UP (Optional)

The Follow Up gives other ideas or activities which may be used to reinforce the concepts presented in this material. Ways of including Follow Up are:

1. List or refer to follow up activities stated in the Teacher's Manual.
2. Devise creative reinforcement activities.
3. Refer to similar types of material by title.

SUMMARY, CAUTION, FOLLOW UP - Examples

Following are examples of the Summary, Caution, and Follow Up for several materials.

---

1. Title: BEFORE - Primary Math Concepts (M)
   Publisher: Tapes Unlimited
   Summary: Child listens to directions on tape and writes the correct number in a square on the card. They are to write numbers that come before 24, 9, 6, 39, 50, 14, 97, 42, 21, 63, 18, 1, 75, 13, 58, 86. Directions are given on tape to erase number that comes before.
   Caution: Correct answers are never given on the tape. Would be helpful to have a correction sheet for child to correct his own before the section to erase them.
   Follow Up: 1. Have children in group verbally say a number. Person next to him says a number before. Go around group giving each child a chance. Could do this similar to a spelldown.
   2. Could use same cards to make a Bingo Game. Write number on cards. Draw or read off a number that comes before.

---

2. Title: INEQUALITIES I - Level B, Elementary School Mathematics Minisystems (M)
   Publisher: Learning Systems, Corp.
   Summary: Compares sets by matching one to one, then compares numerals by naming sets. Concept of one to one correspondence helps student see why one number is greater than another number. Inequality symbol is used in comparing numbers. Play cassette while working and checking answer sheet with pencil. Teacher's Guide contains answer key.
   Caution: Lesson is long for instructional level. May use it in two lessons.
   Follow Up: Worksheets using inequality symbols.

Continue to next page

3. Title: JUMBO ALPHA-NUMBER #7770A (M)
   Publisher: Laurie Enterprises, 1968
   Summary: Child can take the letters and numbers out of their rubber frames, mix them up and then fit them back into correct space. Teacher can use a flannel board to show the letters and numerals, teaching their names.
   Caution: Since there are no lower case letters, children could only form names with all upper case. There are no extra letters to use in forming words.

---

4. Title: INTRODUCTION TO ZERO, #3071 (M)
   Publisher: Wollensak - 3M Company
   Summary: Roman and Egyptian number systems are briefly explored and compared to our Hindu-Arabic system. The Hindu-Arabic number system is shown to be the only one with place value, which necessitates the zero as a place holder. Worksheet exercises reinforce the value of zero. Learner self corrects worksheet with the tape.
   Follow Up: Tape suggests student rewrite the numbers in worksheets exercised 3 and 4 using the Roman and then the Egyptian number systems. Students could make a list of places where the Roman numeral system is used. Show how numbers would differ if we didn't have a zero.

Continue to next page.

DIRECTIONS AND SKETCH FOR "S"

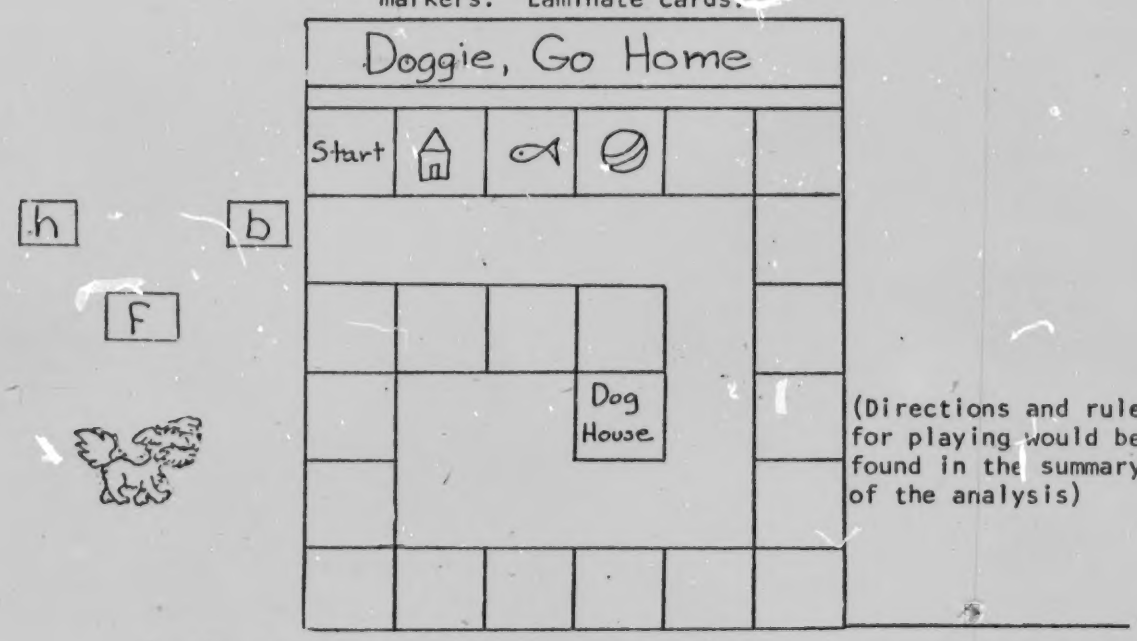
When the material being analyzed is not a commercially prepared item, directions for making it and a sketch of it (if necessary) must be included so others may replicate it. For instance, with a teacher made material, other teachers will want to know what is needed to make it and what it should look like.

Complete the analysis in the manner you have just learned. For author, enter the name of the person who created the idea. Then on the back or wherever there is room, add the directions and sketch. Be sure to include materials needed to make it and the procedure for constructing it.

The completed entry should look something like this.

EXAMPLE:

Title: DOGGIE, GO HOME
Author: Georgia Payne, Nancy Plass
Publisher: Bethany School, Lincoln, Nebraska, 1972
. . .Continuation of Analysis Entries. . .
Directions: Make game cards of 8-1/2" x 11" oak tag. Section the card and add pictures of objects in each section. Print consonant letters on 2" x 3" pieces of oak tag to use as drawing pile. Use small plastic dogs as markers. Laminate cards.



(Directions and rules for playing would be found in the summary of the analysis)

Continue to next page.

ANALYSIS

This is a completed analysis. Read it carefully and compare it to what you have just learned in the Workbook.

Office Use: I [ ] C [ ]

Analyst's School Moon Elementry

Type: D (H) T S

Title, Number, Author: WORD PREFIXES #1202

Publisher, Date: Kenworthy Educational Service, 1961

*Specific Descriptors: prefix, root word

Code Numbers
D4-14.
D4-16.

*Major Area, Major Skill: Reading - Structural Analysis

*Instructional Level Grades 3-6 P K 1 2 (3 4 5 6) 7 8 9

*Interest Level: Intermediate 1 2 (3) 4 5

*Format: Card (7)

Contents Set of 11 cards 6"x12", with 6 words per card having the same prefix.

Additional Equipment: None

*Input Mode: 1) Auditory (2) Visual 3) Tactile 4) Auditory-Visual 5) Visual-Tactile 6) Auditory-Tactile

*Output Mode: (1) Verbal 2) Non-verbal

*Teacher/Learner Interaction:

# Learners:	Independent	Teacher directed
	1) large group	4) large group
	(2) small group	(5) small group
	(3) individual	(6) individual

Time: Varies, perhaps 3-5 minutes per card.

Objective: To match prefix with root word to form and say a new word.

Entering Tasks: Know the prefixes and root words used.

Summary: This set of cards presents 23 different prefixes blended to form 216 words. The meaning of each prefix is given, and the words being shown are keyed on back of each card. The learner folds the end of the card to read new words formed by a prefix and root.

Directions and Sketch for 'S':

Caution:

Follow Up:

*Coded for Retrieval - Use MARS Coding Guide

Analysis Sheet
MARS - Revised
6-73

You have completed the sections on analysis, continue to the next section for additional information.

EVALUATION

The following sections also appear on the Retrieval Card. The evaluation data discussed here is gathered by use of the form below.

MERC STUDENT ID #_____

Educational Resource Evaluation

Directions: Teacher completes this form each time an educational material is used in a treatment strategy. Circle the best answer to indicate effectiveness of resource.

Objective for Use:

Level of Use:
Title:

Publisher:

P = Poor	
F = Fair	
A = Average	
G = Good	
E = Excellent	

1. How well did the educational resource meet the teacher's objective for which it was selected?	1. P E A F G
2. How well did the educational resource meet the child's need?	2. G P A F E
3. How sufficient were the instructions given with the resour[illegible] its use by the teacher?	3. F G A E P
4. How acceptable was the amount of time required for teacher preparation to use this resource?	4. F A E G P
5. How easy was the resource for the child to use?	5. P A F G E
6. How interesting was the resource for the child?	6. E F G P A
7. How strongly would you recommend this resource again for a similar objective?	7. P F A G E

8. Suggested changes or other uses of this material:

9. Suggested changes of information found on the MARS card for this material:

MERC 4/11/73

As you devise prescriptions and teaching strategies using information on resources retrieved from the MARS Retrieval Set, you will be asked to evaluate those resources actually used with handicapped learners. When the completed evaluations are returned to the Center, they will be sorted by title and by objective. This

Continue to next page.

data will be statistically compiled and entered on the back of the retrieval card. An evaluated effectiveness rating will be coded on the front of the card.

See MARS Coding Guide, page 14, for Evaluation Descriptors.

The next two sections are to be entered on the Retrieval Card by personnel at the school. Information gathered through the inventory is used here.

LERS LOCATION

This indicates the school location of resources within a district. This requires merging the inventories of participating schools within the district to get a listing of all the locations of each title or resource.

EXAMPLE: Great Star District

1. Nova School
2. Sun School
3. Moon School

Title: WHAT THE LETTERS SAY #2300

Title: Phonics Game Series
Author: Dolch, Edward W.
Publisher, Date: Garrard, 1955
Location: 1. Nova School
2. Moon School

SCHOOL LOCATION

This indicates the location of the resource within a school building. See Coding Guide, page 14. Enter the location in the box on the Retrieval Card.

EXAMPLE:

School Location:
Room 202

School Location:
Media Center #RR36

School Location:
Room 27, 29
Principal's Closet

Continue to next page.

FINALE

You have now been presented with all the information needed to complete an analysis of an educational material and to prepare the Retrieval Card for use. Other resources are analyzed and prepared in much the same way.

The following page shows Inventories and a completed Retrieval Card prepared for use.

Continue to next page.

MEDIA INVENTORY

School Sun School (#2) Great Star District

Room Media Center

Title (1, 2, 3)	Number (4)	Series (5)	Catalog Number	Author (6)	Publisher (7)	Date (8)
WORD PREFIXES	1202		R-36		Kenworthy	1961

MEDIA INVENTORY

School Moon School (#3) Great Star District

Room 202

Title (1, 2, 3)	Number (4)	Series (5)	Author (6)	Publisher (7)	Date (8)
WORD PREFIXES	1202			Kenworthy	1961

D M T S Type | P P K 2 3 4 5 6 7 8 9 Level | 1 2 3 4 5 6 Interaction | A B C D E F G H I J K L M Major Area | 1 2 3 4 5 6 7 8 9 10 Major Skill

Specific Descriptors

Interest | LERS Location | School Location: Room 202

Title: WORD PREFIXES #1202 (M)

Specific Descriptors
Code Numbers: D4-14*
D4-16*

Publisher: Kenworthy Educational Service, 1961
SpecificDescriptors: prefix, root word
Major Area, Major Skill: Reading - Structural Analysis
Instructional Level: Grades 3, 4, 5, 6 (3,4,5,6)
Interest Level: Intermediate (3)
Format: Card - Set of 18 cards 6" x 12", with 6 words per card having the same prefix. (7)
Additional Equipment: None
Input Mode: Visual (2)
Output Mode: Verbal (1)
Teacher/Learner Interaction: Independent large group, small group, individual; Teacher directed large group, small group, individual (1,2,3,4,5,6)
Time: Varies, perhaps 3 - 5 minutes per card.
Objective: To match prefix with root word to form and say a new word.
Entering Skills: Know the prefixes and root words used.
Summary: This set of cards presents 23 different prefixes blended to form 216 words. The meaning of each prefix is given, and the words being shown are keyed on back of each card. The learner folds the end of the card to read new words formed by a prefix and root.

Sample - Card for Moon School

Input | Output | Format | Evaluation

MARS - Revised
6-73 P.W.

TEACHER EVALUATION (On back of Retrieval Card)

Objective #1: Given a prefix and a root word, the learner will form and say a new word.

Instructional Level: Grade 2 (N=6 - 6/24/73) Range- (±1 = 3.1→4.1)

Objective #2. . . .

	Obj. 1 X	Obj. 2 X	
1. Objective	3.8		
2. Need	4.2		
3. Instructions	4.0		
4. Time	3.7		
5. Easy	3.3		
6. Interesting	2.6		
7. Recommend	3.8		
Overall Mean.	3.6		

C O N G R A T U L A T I O N S ! !

You have learned the skills necessary for MARS Analysis. Now you need to practice them. Continue to the Assignment.

ASSIGNMENT:

1. Analyze one commercial material.
2. Analyze an idea for a teacher made material.

When completed, hand these analyses to your trainer for checking.

T H E E N D

MARS - Revised
6-73 P.W.

APPENDIX

MARS

MEDIA INVENTORY

List all reading and math, kindergarten through grade 3 materials existing in your building, owned by the school. Fill in entries as completely as possible in the following manner.

1. Title Words which apply specifically to only that item.
2. Any of the terms "Grade," "Part," "Level," "Book" which appear on the material. List in the order in which they appear.
3. Any of the terms "Activity Book," "Exercise Book," etc., if part of the title.
4. Publishers Number which is printed on or with the material or which appears in the publishers catalog.
5. Series Name, if applies.
6. Author, if applies.
7. Exact name of Publisher, producer or distributor who printed or produced the material.
8. Last copyright date given on the material.

MEDIA INVENTORY

School_____

Room_____

Title (1, 2, 3)	Number (4)	Series (5)	Author (6)	Publisher (7)	Date (8)

MARS 4-73 67

APPENDIX C

Use of the Retrieval Set

Student ID #_____

Educational Resource Evaluation

Directions: Complete this form each time you use an educational resource (material) in a treatment strategy. To be completed by strategist and/or teacher. Circle the best answer to indicate effectiveness of resource.

P = Poor
F = Fair
A = Average
G = Good
E = Excellent

Title of Education Resource:

Publisher:

1. How well did the educational resource meet the teacher's objective for which it was selected?	1. P	E	A	F	G
2. How well did the educational resource meet the child's need?	2. G	P	A	F	E
3. How sufficient were the instructions given with the resource to direct its use by the teacher?	3. F	G	A	E	P
4. How acceptable was the amount of time required for teacher preparation to use this resource?	4. F	A	E	G	P
5. How easy was the resource for the child to use?	5. P	A	F	G	E
6. How interesting was the resource for the child?	6. E	F	G	P	A
7. How strongly would you recommend this resource again for a similar objective?	7. P	F	A	G	E

---

8. Suggested changes or other uses of educational resource:

9. Suggested changes of information found on the MARS card for this educational resource:

MERC - '72

USING THE RETRIEVAL SET

The MARS Retrieval Card Set is the product of the analysis of educational resources. When the Retrieval Set for a school building is fully developed, it will make possible the retrieval of analyzed information on all resources inventoried for that building and facilitate the location of those resources within the building.

The printing of the cards, grooving, sorting by inventory, and packing for shipment is done at the regional office. When the set arrives at the school building, there are still several steps needed to complete its preparation for use.

PREPARING THE MARS RETRIEVAL CARD SET FOR USE

1. Crossreference Cards

On the upper right hand corner of the analysis printed on the card, under Code Number, several numbers are listed. Some or all of those numbers have an asterisk by them. The ones with the asterisk are grooved or punched out on the retrieval card containing the analysis. The codes grooved on the card correspond with the Major Area, Major Skill entry in the analysis. Because of the nature of this type of retrieval, the other code groupings must be grooved on a Crossreference Card.

You have a set of crossreference cards, each of which has a number on it - i.e., A1, D2, etc. When an analysis has a code number on it which does not have a star by it, that resource title and appropriate three symbol code must be entered on one or more of the crossreference cards.

For instance, if an analysis has code numbers D4-14, D4-16, and A2-8, the D4 numbers are grooved on the analysis retrieval card. The A2-8 number must be crossreferenced on the A2 card. See the Programmed Workbook, p. 19, for further explanation. Enter the title, that code number you are crossreferencing, and under Sort for #, enter the first code number on the analysis retrieval card which has an asterisk by it.

You will receive a listing of entries for each crossreference card. It will contain all crossreferenced titles in the system. You should check off the titles appropriate for your set on each crossreference card and enter that information on your own cards.

The crossreference card should be grooved for each number listed under Code # only. The Sort for # listed for each title will refer the user back to the original analysis.

To use, file the crossreference cards with the rest of the cards in the box in the appropriate sections. When a crossreference card is retrieved through usual sorting procedures, the user locates the desired code number and title in the list and using the Sort for # again sorts the cards and obtains the analysis for that title. The titles retrieved in this manner usually have a smaller amount of information on the desired Specific Descriptor.

2. Location

In the small box labeled School Location on the upper left side, you may enter the name or number of the place where this material is usually stored. If it is normally stored in a certain teacher's room, you may write in "Mrs. Smith's Room or Room 207." If it is housed in the school media center, you may write in the Dewey number. This information should come from your inventory.

Also groove the card as needed for the appropriate LERS Location coding.

See the Coding Guide, p. 11 and the Programmed Workbook, p. 62 for more information.

3. Box

The MARS cards work most efficiently when divided into major area groupings. Your box has dividers and each of these divisions should be labeled to contain a grouping.

Using a labelmaker or masking tape, label each section of the box: Reading, Math, Other. Using the sorter, sort out the Major Area D cards for the Reading section; the F cards for the Math section. Everything left goes in the Other section, i.e. Language Arts, Social Studies, Process, etc.
(Example on following page)

TYPE | LEVEL | INTERACTION | MAJOR AREA | MAJOR SKILL | SPECIFIC DESCRIPTORS

LERS LOCATION
SCHOOL LOCATION:

D5 CROSSREFERENCE CARD

The code you retrieved

Title	Code #	Sort for #
1. Vowel Sounds - A Self Instructional Modalities Approach	D5-26	D2-12
2. Long and Short Vowels #49	D5-26	
3. Read On, Criterion Tests in Reading Skills	D5-1, D5-3, D5-4, D5-9, D5-10, D5-16, D5-23, D5- , D5-20, D5-22, D5-24, D5-27	
4. Reading Skill Cards, Sets A-G		
5. Spell-O-Grams, Kit E, Spelling Learning Games		

Code for original analysis - Retrieve again to get card for this title.

TYPE | LEVEL | INTERACTION | MAJOR AREA | MAJOR SKILL | SPECIFIC DESCRIPTORS

LERS LOCATION
SCHOOL LOCATION:

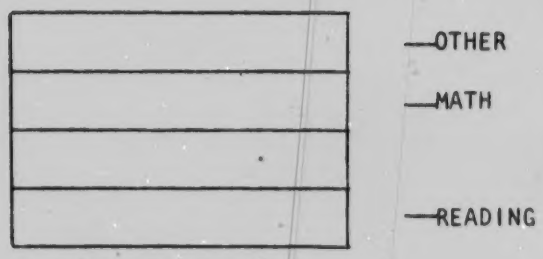
Title: VOWEL SOUNDS - A SELF INSTRUCTIONAL MODALITIES APPROACH (M)
Sounds of A - Lesson 1 and 2
Sounds of E - Lesson 3 and 4
Sounds of I - Lesson 5 and 6
Sounds of O - Lesson 7 and 8
Sounds of U - Lesson 9 and 10

Specific Descriptor Code Number: D2-12*
D5-14

Author: Dr. John Pescosolido
Publisher: Milton Bradley, 1970
Specific Descriptor: Short vowels -- word patterns
Major Area, Major Skill: Reading - Phonics
Instructional Level: Grades 1, 2 (1,2)
Format: Cassette tape, worksheets, manipulative teaching aid (1, 18, 19)
Ten lessons - two on each vowel in 5 boxes. In each box is 1 cassette tape, 1 manipulative and 2 packs of 72 response sheets.
Additional Equipment: Cassette tape player, pencil
Input Mode: Auditory - Visual (4)
Output Mode: Nonverbal - manipulate, mark, write (2)
Teacher/Learner Interaction: Independent individual or small group
Time: 15 minutes
Objective: To provide auditory, visual and kinesthetic perception of vowels and vowel consonant combinations.
Entering Skill: Previous knowledge of each vowel sound used, and of consonant sounds used.
Summary: Student hears vowel sounds, sees vowels in word context, and manipulates teaching aid to form meaningful words. Word development is achieved in two ways. Vowel sound are presented with emphasis on isolated sounds of letters in word settings. Vowels are also presented as they combine with consonants to form phonemes. Vowel consonant combinations are further reinforced as the child writes them on the response sheets.

EVALUATION | FORMAT | OUTPUT | INPUT

EXAMPLE:



(Front of Box)

Now the retrieval card set is ready for use.

HOW TO RETRIEVE FROM THE CARD SET

Materials: MARS Coding Guide
Set of Retrieval Cards

When using the key sort card set, be sure the clipped corner is at the upper left hand side.

1. Decide what type of educational resource is desired. See Coding Guide, p. 1. Using the sorter, sort a handful of cards for the desired type of item by skewering the correct code letter hole. Cards which fall out contain the desired coding. Cards which stay on the sorter do not and should be returned to the box.

2. Choose the desired instructional level. See Coding Guide, p. 12. Sort for instructional level. Keep the cards which fall out--they describe educational resources of the desired type and instructional level. Return other cards to box.

3. Select the desired Teacher/Learner Interaction. See Coding Guide, p. 13.

4. Sort for Interest Level (left side). See Coding Guide, p. 12.

5. Select the term and code for Specific Descriptor. See Coding Guide, p. 3-11 for Specific Descriptors by skill areas and/or p. 15- for alphabetical listing of specific descriptors. Three sorts are necessary to select the three symbols of the code. Sort first for Major Area letter; return left over cards to box. Sort for Major Skill number, then for Specific number. You have sorted for the

three symbol code and should have cards for the appropriate type of item, instructional level, teacher/learner interaction, interest level, and specific descriptors. All other cards should have been returned to the box.

6. Input, output, format, evaluation, and LERS Location codes may also be selected from the Coding Guide and the cards sorted. With each sort, the number of appropriately coded cards grows smaller. For the codes see pages:

INPUT:	page 13
OUTPUT:	page 13
FORMAT:	page 12
EVALUATION:	page 14
LERS LOCATION:	page 14

7. The retriever should now have one or more cards which meet the stated criterion. The cards will describe resources which exist in the building. The location in the school of each resource should be listed on the card. The cards may be read, the resources examined and the most appropriate selected for use with a learner.

Level II. TEACHER JUDGMENTS

Part A. Measuring Teacher Responses to Instructional Materials

MEASURING TEACHER RESPONSES TO INSTRUCTIONAL MATERIALS

Glenn Latham
University of Oregon
Special Eduation Instructional Materials Center

The evaluation of instructional materials has been a persisting concern to all levels of public school education (Bijou, 1966; Eash, 1969; Eisner, 1970; Gardner, 1966; Grafft, 1966; Jessen and Prendergast, 1966; Popham, 1970; Stolurow, 1966; Temp, 1966; Ward, 1970; Wolf, 1969). A review of the literature on the subject leads one to believe that everyone is talking about it, nearly everyone is doing something about it, but no one seems to be getting very far at it. This writing, hopefully, will shed some light on at least one aspect of the problem--measuring teacher reactions to instructional materials--and help point the way to more productive research.

The Problem

Efforts to involve teachers in the evaluation of instructional materials have focused, for the most part, on getting teachers to record their reactions to a given material on some type of "materials evaluation" form. Typically, getting useful data via this means has been fraught with two prevailing problems: (1) designing an instrument that measures the worth of a given material for instructional purposes and (2) getting users of instructional material to adequately complete and return the evaluation instrument so that the data can be analyzed.

A careful review of over 30 instruments used throughout the country has revealed a variety of approaches to assessing the value of instructional materials for educational purposes. Although all the instruments are common in a number of ways, one obvious commonality is that they do not measure the educational value of an instructional material. In other words, in no way can the data from such instruments be interpreted to identify a given instructional material as "good" or "poor," "effective" or "ineffective" as an aid to learning. What they appear to measure is teacher's <u>perceptions</u> of the value or worth of instructional materials as aids to learning. This finding has prompted a suspicious view toward the accuracy of the term "materials evaluation."

A more accurate term, though somewhat clumsy, is <u>user reaction</u>. Indeed, we can, and do, measure user reactions and we are able to do so with some degree of sophistication. However, the day to day

involvement of teachers in actually determining the value of instructional materials (i.e., "good," "bad," "effective," "ineffective") does not appear to be a reality at present, though the need for such is overwhelming.

Though it is possible to measure user reaction to instructional materials, the critical matter of getting teachers to record their reactions on an "evaluation" instrument, and to get that completed instrument into the hands of those seeking the data, is a problem of perplexing and frustrating proportions. Typically, teachers couldn't care less about the concerns for data of those collecting "the stuff." As one teacher so "disrespectfully" noted on an uncompleted form, "I am so damned tired of filling out these rotten, irrelevant forms that I'd rather go without the use of the material than be faced with another one of these!" In a word, teachers see no pay-off for the time and energy spent in providing such data. Such a circumstance has led teachers to view as punishing the task of formally responding regarding their experiences with instructional materials.

The Study

To determine the dimensions of these two problems, a two part study was conducted. First, an item analysis was completed on over 30 "evaluation" instruments which had been collected from throughout the nation. It was felt that such an analysis would reveal the real intent of the instrument as that might contrast with the stated or desired intent of the instrument. The concern here was not to expose some subtle scheme of authors of evaluation forms to get information in a surreptitious manner. Rather, it was an attempt to find out whether "materials evaluation" forms, if by no reason other than their title, might be perpetuating a myth, that myth being that such instruments indeed measure the value or worth of materials for instructional purposes.

The second part of the study focused on teacher reactions to the forms. Teachers were selected at random and interviewed regarding their feelings about filling out the materials evaluation forms. They were asked very simply, "How do you feel about completing such materials evaluation forms as these (they were shown typical forms) on materials you have used with your students?"

Item Analysis

"Evaluation" items tended to fall into two broad categories, items seeking topographical data, such as the type of students with whom the material is being used, age of students, subject being taught, etc., and items seeking teachers reactions to the materials,

such as "How relevant was the material for your instructional needs?", "Would you use the material again?", etc. The "reaction" items tended also to be dichotomous, seeking teachers responses to the practical aspects of the material such as durability, cost, and ease of use, and teacher responses to the instructional value of the materials, such as "is the material well sequenced?" "Does it allow for appropriate practice?" "Is the use of the material reinforcing to the children?", etc. The distribution of items contained in typical "materials evaluation" forms is shown in Table 1. As noted earlier, the results of this analysis raised grave doubts about the evaluative capacity of such instruments to identify a given instructional material as "good" or "bad," "effective" or "ineffective" for instructional purposes. The overwhelming trends were toward the gathering of information about the instructional setting and teacher's subjective reactions to the materials.

Teacher Interviews

Teacher responses to questions related to their feelings about "materials evaluation" instruments stabilized quickly. It was amazing how many different ways teachers could indicate that they didn't like something. An initial intent of this part of the study was to interview 25 teachers; but after 12 interviews, it was concluded by the author that to pursue the matter further was a waste of valuable time, energy and resources. In a word, teachers dislike filling out such forms. The following are representative of teacher's feelings: "They take too long." "I seldom know what to write." "They don't make sense." "I just refuse to fill out any more of those things." "It's a bother. I have more important things to do." "I fill those out and that's the end of it. I never get any information back to do me any good." "I suppose that this information is important to some people but it sure isn't to me." With feelings such as these, it is no wonder that so few teachers will trouble themselves to complete and return the forms.

The fact that so many teachers regarded the instruments as irrelevant and of no value to them prompted the author to examine the extent to which items in the instruments were consistent with what teachers regarded as important. To measure this, 37 teachers were asked to list those things that they would like to know about instructional materials, assuming that it was possible to get such data. Their responses were compared with those items found in existing materials evaluation forms. A comparison of grouped responses revealed that only 27% of the items on the "materials evaluation" forms would likely yield data of interest to teachers. It is hardly any wonder that teachers refuse to trouble themselves to provide so much data for others that have so little relevance to themselves.

TABLE 1

DISTRIBUTION OF ITEMS CONTAINED IN
TYPICAL MATERIALS EVALUATION FORMS: AN ILLUSTRATION

Topographical	Teacher Reaction	
	Practical Value	Instructional Value
Type of Students	Durability	Sequenced
EMR TMR		
Age of Students	Cost	Reinforcing
Grade Level	Ease of Use	Reliable
Subject Matter		

The characteristics of instructional materials which were most frequently identified as important by the teachers interviewed are listed in Table 2. The list is dichotomized and each column contains the 12 characteristics of greatest importance.

These lists were derived in the following manner: First, the teachers were asked to list, separately, those practical and instructional characteristics of instructional materials which they felt were of most importance to them. Second, they were presented with composite lists of all characteristics and asked to rank them in their order of importance. Each list contained the 12 most frequently mentioned characteristics. It should also be noted that most "materials evaluation" forms solicit teacher responses to most of these items, but they do so, typically, in such an undesirable way, that the task of responding proves offensive. This, coupled with requests for a plethora of other information of little or no interest to the teachers compounds the problem to the point of making the matter intolerable.

Important Considerations

Although existing "materials evaluation" forms really don't evaluate the worth of materials for instructional purposes, and even though teachers dislike responding to "materials evaluation" forms, one must not assume that the reactions of teachers about the instructional materials they use are not valuable and should not be gathered. As consumers we appreciate and value the judgments, feelings and opinions of our peers about goods and services that are available to us. What is needed is a data gathering procedure which has integrity, is palatable to the respondent, and which provides for the cycling of the data back to the respondents in a way that is both meaningful and helpful. The following are related to that need.

Teachers Concerns

Initially, attention should be given to the development of an instrument that reflects teacher concerns. Evaluation specialists need to get out of their isolated bailiwicks and find out what is in the minds of the consumers of instructional materials. It is obvious to the author, at least, that precious little of this has been done here-to-fore.

Instrument Design

There appear to be some obvious characteristics of existing "evaluation" instruments which make them immediately offensive to the respondent. First is length. Multi-page instruments are simply unattractive. Pilot studies by the author suggest that the shorter the instrument, the better; preferably <u>less</u> than one full 8-1/2 x 11

TABLE 2

CHARACTERISTICS OF INSTRUCTIONAL MATERIALS
OF MOST IMPORTANCE TO TEACHERS

Practical Characteristics	Instructional Characteristics
1. Effective	1. Contains instructional objectives
2. Motivating to students	2. Tasks are sequenced
3. Cost	3. Reinforcing to students
4. Adaptable	4. Allows for immediate feedback
5. Durable	5. Has transfer value
6. Interesting to students	6. Content is valid
7. Availability	7. Allows for appropriate practice
8. Relevant	8. Reliable
9. Understandable	9. Has a S-R format
10. Easy to use	10. Disability related
11. Allows for student-teacher interaction	11. Allows for ongoing evaluation
12. Contains a teacher's manual	12. Provides a multi-sensory approach to instruction

page in length. Secondly, teachers react negatively to instruments that require written responses. If it is at all possible, and there is every reason to believe that it is, the teacher should be able to respond by checking items listed. Allowances should be made for open ended responses should the items listed not be adequate. A written response is both physically and mentally tiring, is time-consuming, and is often so ambiguous as to be useless to the evaluator. A third characteristic of instrument design which can "turn teachers off," and which requires careful consideration is general appearance. A neat, typeset, easy-to-read, --yes, even easy-to-look-at instrument that is quickly "sized up" by the respondent and seen as non-threatening appears, on the basis of initial field testing, to be more likely completed and returned by the respondent. In this regard, it was interesting to note that some teachers viewed the "evaluation instrument" in much the same light as they viewed an examination, suggesting that care be taken to make sure that the format of an instrument be designed to avoid its being confused with a test. Lastly, teachers appear to react negatively to instruments that contain numerous items. In fact, there is evidence to suggest that more than 10 or 12 items is too many. While field testing is one instrument, for example, every item to which a teacher might respond was numbered, and totaled 52. When teachers saw the number 52, they tended to grow weary immediately, even though the instrument was no larger than an IBM punch card. The instrument was re-designed, items were grouped into 10 areas, and only the areas were numbered (see Figure 1). Under these circumstances, the instrument was much more acceptable, even though the task for the teacher, and the size of the instrument, remained exactly the same as before.

Data Collection Procedures

There is probably nothing that can be said with more certainty about teacher reactions to data gathering instruments than that they loathe the task of repeatedly filling out a form every time they use an instructional material. And yet this is what they are repeatedly asked to do. To deal with this, a simple research procedure is showing promise. Over three randomly selected periods of time during the school year (two weeks, or 10 consecutive school days), one for each nine-week school session, teachers are being asked to complete a Materials Use Response Card on each material they use only during the three selected periods. Under these conditions, they seem to be more willing to cooperate, knowing that they will not have to shoulder this burden indefinitely. It would be assumed that such a procedure would yield less data, but this does not appear to be the case, over the long run. Rather than a lot of data coming in at the time an evaluation procedure is initiated, but then falling off drastically over time, as happens with continuous data collection procedures, an intermittent data gathering schedule seems to encourage a high response

FRONT

TEACHER: COMPLETE, AND RETURN TO SEIMC WITH THE MATERIALS

1. Number of pupils with whom materials were used _____

2. You are a
   - _____ Regular class teacher
   - _____ Special class teacher
   - _____ Other (please specify) _____

3. With what type of children did you use these materials?
   - _____ EMR
   - _____ Physically handicapped
   - _____ Speech impaired
   - _____ Multiply handicapped
   - _____ Partially sighted or blind
   - _____ Hard of hearing or deaf
   - _____ Other (please specify) _____

4. School placement of children using the materials
   - _____ Preschool
   - _____ Primary
   - _____ Intermediate
   - _____ Junior high
   - _____ Senior high

5. Location of your class
   - _____ Public day school
   - _____ Other (please specify) _____

6. Instructional purpose
   - _____ Reading
   - _____ Arithmetic (Math)
   - _____ Social Studies
   - _____ Sciences
   - _____ Language Arts
   - _____ P.E.
   - _____ Music and Art
   - _____ Other (please specify) _____

FOR OFFICE USE ONLY

Center _____

Name of Material (if necessary specify series and/or level) _____

Date sent _____ Date returned _____ Condition upon return: Poor Fair Good Excellent

BACK

7. Check the items below which best describe the value of this material for YOUR instructional purposes.

_____ Durable	_____ Practical	_____ Reusable	_____ Instructional	_____ For small group use
_____ Mediocre	_____ Inflexible	_____ Challenging	_____ Inappropriate	_____ For individual use
_____ Exciting	_____ Entertaining	_____ Boring	_____ Effective	_____ Easy to manage
_____ Disorganized	_____ Not relevant	_____ Informative	_____ Unenjoyable	_____ Suitable length
_____ Attractive	_____ Unclear	_____ Inadequate	_____ Inaccurate	_____ Interesting to students

8. Would you use this material again? Yes _____ No _____

9. Is this material readily available to you through any source other than the SEIMC? Yes _____ No _____

10. Comments and/or explanations (if you wish) _____

SEIMC MATERIALS USE RESPONSE CARD

Figure 1. Materials use response card.

rate over short periods of time as illustrated in Figure 2. Over long periods of time, three to four years, it seems obvious that randomly selected samples of data would yield a pattern of responses that would be highly representative of the population, and would be useful in aiding teachers in the selection of instructional materials.

Feedback to Teachers

As observed earlier, a common complaint of teachers is that their involvement in "materials evaluation" is one-way, and that it is away from them. It is proposed, therefore, that when teachers are asked to provide data about their experience with instructional materials that they be assured that their responses, and those of their peers, will be routed back to them in a way that will aid them in their task of selecting appropriate materials for their instructional needs. Certainly, in this day of rapid computerized data analysis, there is no end to the resources available to serious evaluation specialists in the accomplishment of such a task.

Teacher Use of Data

Although teachers express an interest in receiving feedback about peer responses to instructional materials, and although there is reason to suggest that such feedback can be provided in an understandable and cogent way, we are still not sure that once teachers have such data that they can or will use those data to modify their interaction with instructional materials. Little is known about the dynamics involved in the decision making processes of teachers, and before feedback about instructional materials can be meaningful, it appears that more needs to be known about these processes.

Conclusion

It is a phenomenon that in this era of Naderized Consumer Protection, at a time when teachers are bombarded as never before with appeals and advertising pitches from scores of publishers to buy their tens of thousands of materials, that so little is said and less is known about the documented instructional worth of the product. What we need, perhaps, is a "good school-keepers seal of approval" stamped on each instructional material after it has been determined to be field worthy and psychologically as well as physically safe for students.

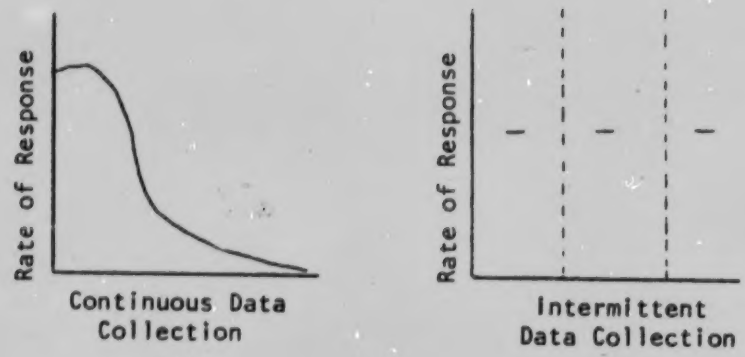


Figure 2. Illustrated response rates over time, using continuous and intermittent data gathering schedules.

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Level II. TEACHER JUDGMENTS

Part B. Teacher Evaluation of Instructional Materials

TEACHER EVALUATION OF INSTRUCTIONAL MATERIALS

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The intent of this paper is to delineate a methodology for the gathering of classroom teacher evaluations of instructional materials. The paper focuses on three issues related to this general topic: (1) the need to include teachers in the process of materials evaluation; (2) the selection of items for inclusion in the instrument; and (3) the strategy that might be utilized in collecting, analyzing and disseminating the information.

The Need to Include Teachers in the Process of Materials Evaluation

Consumers must begin to look critically at the effectiveness of the material they plan to use as an educational intervention (Tyler and Klein, 1973). If we define a consumer as one who utilizes the instructional material, then it is appropriate to list the classroom teacher as one of the prime individuals to be looking critically at the value of an instructional material.

The question remains "should the teacher be involved directly in the evaluation of the material" or "should some group or individual provide the teacher with information" or both? The answer to this question is twofold. That is, there are certain types of evaluative information which are best provided by teachers while there are other types of evaluative information which call for the use of alternative strategies. The present paper focuses on issues related to teacher generated evaluative information.

Within the context of the Special Education Instructional Materials Center (SEIMC), three sources of materials evaluation information have been identified: the classroom teacher, the SEIMC library staff and SEIMC consultants (Ward, 1968). Support of teacher evaluation of instructional materials is indicated in the generation of a list of questions teachers should ask of materials when purchasing or borrowing them for use in the classroom (Ward, 1968). Since the teacher observes events as they occur in the process of utilizing the instructional materials as an intervention, he becomes an "informed source" (Glass, in press) for utilization and intervention information. Therefore, one reason for involving the teacher in the evaluative process is that the teacher is a potentially good source for particular types of evaluative information.

Second, as has been indicated earlier, it is important to involve the consumer of the information in the process of collecting the information. If teachers are not involved in the information collection process, they may be less willing to use the information provided. The non-use by teachers of the evaluative information which can be provided by teachers may result in an increased cookbook use of materials by teachers (Junkala, 1970). The primary reason for evaluation is to provide data for the decision maker; in the majority of cases the decision maker is the teacher. It would therefore seem appropriate to include this individual in the evaluation process.

It is inappropriate to evaluate curriculum materials without including the teacher because of training and experience (Scriven, 1967). The involvement of teachers should most certainly occur in the formative as well as summative stages of evaluation. The teacher can serve as a viable source of information on the modification or adaptation of the instructional materials under scrutiny (Lehrer, Melnick and Greenberg, 1973).

The utilization of teachers in the evaluation of curricular materials may lessen the gap between teachers and curriculum developers. The employment of teachers in the process of evaluation increases the probability of their involvement in the program (Lehrer, et al., 1973). Since teachers' perception of the curriculum vitally affects success of program implementation, it is important to assess the attitudes of teachers toward the materials (Lehrer, et al., 1973).

Teacher feedback has also been found important in the evaluation of materials under development (Grobman, 1968). Teacher participation in field studies has been found to lead to meaningful remarks which can be utilized for material revision (Meyen, 1971).

There may not be a strong relationship between assessments made by teachers and others outside the classroom. Teacher involvement in evaluation is also seen as an educational mechanism (Nelson and Grenda, 1973). Teacher based evaluation assists teachers in managing instructional objectives.

There is evidence that teachers may have more faith in materials evaluation information which is generated from teacher based review. In a survey of potential requestors of evaluative information, it was found that teachers had more positive attitudes toward evaluations by colleagues than they did by nonteaching personnel (i.e., SEIMC staff or professional evaluators) (Baum, 1972).

Ample support has been provided for the need to develop a practical system for the collection and dissemination of instructional materials evaluation information (Tyler and Klein, 1973). The need for evaluative information for decision-making is apparent from the large number of choices available to the consumer. It is time for the consumer to focus concern on the assessment of the worth of these educational products. There now exist literally hundreds of instructional materials that purport to meet a variety of desirable educational outcomes. This expansive conglomeration of available instructional materials might appropriately be referred to as a jungle. There is need to examine specific evaluative criteria which might be used by teachers to get out of the jungle unscathed.

Ample evidence has been provided to support the involvement of teachers in the evaluation of instructional materials. The strategy for retrieving this data remains to be determined. One such method or strategy for retrieving teacher data is the utilization of a structured checklist.

Methodological Concerns Related to the Collection of Teacher-Based Data

Some of the problems that arise when a checklist is employed are detailed by Grobman (1968). When an investigation desires structured reports, a checklist is usually used. It is entirely possible that the checklist may omit important variables. Since this is a closed instrument there is little or no opportunity for the teacher to express additional views. On the other hand, opened reports tend to be cumbersome and include data that is not pertinent to the current investigation. A compromise is a checklist with a comments section where the teacher may record any ideas that are felt to be critical to the successful use of the material (Grobman, 1968).

Psychometric theory has long cautioned against the overuse of questionnaire or checklist research. A major issue is the reaction of the respondent as he completes the instrument. Results of recent unpublished work by the author indicated that this is a valid argument. While evaluating the content of an evaluation form, many subjects responded that they were turned off because the instrument looked too much like a test.

A second criticism of questionnaire research is the variance in the respondents' understanding of the intent of the questions (Grobman, 1968). This concern was supported in a study where subjects were asked to tell what each question meant to them. Results suggest that there was variance in the subjects' interpretation of the question (Roth, personal communication).

These considerations indicate that when a checklist is utilized it should be presented in a manner which is clear and precise. Care should be taken not to use terminology which has a high probability of being misunderstood by the respondent. Further, the instrument should be "non-reactive" in nature. In developing the instrument, care should be taken to include all those variables which are critical to sound evaluation. Finally, opportunity should be provided for the respondent to express ideas beyond those covered by the instrument.

Item Sampling

If a checklist were used, what items should be included? Since it has been advised that reports or evaluation by field practitioners should include the instructional conditions, items which tap this type of information should be included (Ward, 1967). The conditions of use are important because materials can only be judged good or bad depending on how they are used (Ward, 1968). Materials evaluation cannot be separated from "conditions-of-use" (Stake, 1967a). The question of an instructional material's worth has been directly associated with the conditions in which it is used (Junkala, 1970). The characteristics of the pupils who are interacting with the instructional materials are a part of the conditions of use which should be considered in the evaluation of materials. Thus, knowing that a material is good or bad is useless if one does not know under what conditions and with whom the material was used.

Since there are definite contingency relationships between outcome and conditions-of-use, which have a bearing on the judgment of material effectiveness or worth, any instrument designed to gather judgmental information relevant to materials must gather data relevant to conditions-of-use (i.e., conditions), as well as the results of use (i.e., outcomes). "Conditions" information would include variables associated with pupil, teachers and instruction (see Armstrong). In addition to concern for the inclusion of demographic data, the designer must also search for appropriate evaluative items. Consideration at this point must be twofold. On the one hand, the designer must include pupil motivation, task sequencing and cuing. On the other hand, account should be taken of additional variables which might influence a teacher's selection and use of an instructional material. These variables should include content considerations, physical characteristics and special training constraints.

One list of critical evaluation variables which has been developed includes items such as teacher appeal, pupil appeal, adaptability and appropriateness of content (Ward, 1968). Another list has focused on sequencing, readiness factors, pupil performance criteria, special materials (extra to material being evaluated) and special training (Junkala, 1970). Information relative to possible

modification of materials for special purposes has also been viewed as important (Junkala, 1970). An even more comprehensive list of instructional materials variables which focused on material goals and objectives, target population, content structure and scope, learning environment and evaluation (materials and pupil) approaches has also been suggested (EPIE, 1972).

This compendium covers the majority of concerns related to checklist inclusion variables. Any attempt at designing such an instrument should address the broad categories of demographic and evaluative items.

The Instrument

Now that the stage has been set, it is appropriate to present for consideration a materials evaluation form designed under the constraints developed above. The intent of the form is to gather teacher generated materials evaluation data. The form is presented in Figure 1.

The design of the instrument conforms to Digitek Optical Scanning scoring standards to allow for automatic recovery of the data directly from the evaluation. It should be noted here that many major materials evaluation studies have failed to come to fruition mainly because of the investigator's inability to deal with the data. Most materials repositories have a back room filled with boxes of materials evaluation response forms destined for the recycling machine. The use of a machine-readable response form brings evaluation steps closer to the analysis, interpretation and dissemination stages of materials evaluation information.

Perusal of the Figure 1 indicates that the instrument conforms to two of the major criticisms expressed by past and potential respondents. Specifically, the instrument is easy to mark and is only one page long. Further, it is easy to read, taking only 10 to 20 minutes to complete.

There are three major sections in the instrument. Item one focuses on six evaluative categories: curriculum emphasis, content, appropriateness, instructions, physical characteristics and general. The 26 questions within the six categories are responded to by filling in the box adjacent to the item when the material compares positively with the content of the item. At the top of the page space is provided for the teacher to state a terminal objective related to the use of the material. This serves two uses. First, it can be used as a referent while the teacher is responding to the evaluation items. A second reason for including this is to compare the teacher's

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DIRECTIONS Please check the parenthesis next to each comment desired. This form will be returned to you with those boxes marked +, -, NA containing the numerical frequency from those evaluations applicable to those descriptors designated on the reverse side. Please complete both sides of this form.

COMMENTS:

	+	-	NA	
				CURRICULUM EMPHASIS:
( )				Fits existing behavioral objectives
( )				Can be expanded to other phases of curriculum
( )				Helps accomplish objectives of curriculum
				CONTENT:
( )				Organized for sequential development of concepts/skills
( )				Enables student to practice and maintain concepts/skills
( )				Provision made to evaluate progress
( )				Enables student exploration, problem solving, discovery
( )				Allows flexibility; provides for individual difference
( )				Motivating to student
( )				Multi-sensory in approach
				APPROPRIATENESS:
( )				Content
( )				Interest level

	+	-	NA	
( )				Reading level
( )				Vocabulary
( )				Graphic illustrations
				INSTRUCTIONS:
( )				For the student are clear, concise, easily followed
( )				For the teacher are appropriate and easily followed
( )				Allow independent use by student
				PHYSICAL CHARACTERISTICS:
( )				Format
( )				Type size, paper, binding, material used in construction
( )				Size, number of parts, portability, storage factor
( )				Durability
				GENERAL:
( )				Requires in-service training by users
( )				Teaching value or effectiveness justifies its cost
( )				Requires adaption for present purposes

Figure 1. University of Texas teacher evaluation form.

objective with the publisher's stated (or in some cases implied) intent (i.e., expectations for objectives).

The second area addressed in the instrument is demographic in nature. Information is solicited on teacher, child and instructional characteristics. Data generated from this section would include the experience, education and capacity of services of the teacher (used); the type and educational level of the child; and the location and number of children in the instructional program. As can be readily seen these items are intended to satisfy the need for pertinent conditions of use data.

The final section of the instrument deals with used comments. Respondents are asked to reverse the page and offer comments relevant to material use under the constraints of the prevailing conditions of use. The reason for including this section is multi-fold. Space for comment is thought necessary because many materials must be adapted for use with varying populations. It is important to recover these adaptations so that they may be communicated to prospective users so that they do not waste time developing redundant strategies for materials use. The comments are also necessary for the assessment of a material's worth in view of changes of conditions of use. Finally, the comments may lead to a refinement of the potential users objectives for using the material as a tool for educational intervention.

Data Analysis and Use

It is now appropriate to discuss the analysis and use of the data generated by the implementation of the instrument. Information from the form could be converted into IBM computer cards by a Digitek 100 Optical Reader to enable data recovery via a prototype computer retrieval system. This system would accept both demographic and material characteristic descriptions and generate evaluation data specific to those conditions. For example, a teacher may request an evaluation of a material for use with four educable mentally retarded children with an educational age of eight or nine. These descriptors will be input into the system and the output from this system would consist of frequency summation from a subset of the data file corresponding to the specific material under these specified conditions.

The program would be designed to answer what is thought to be critical issue in materials evaluation: Is it valid to make an appraisal of a material's worth when it is separated from demographic variables? It has been established that knowing a material is good or bad is useless if one does not know under what conditions and with whom the material was used. There are definite contingency relationships between outcomes and conditions of use in terms of particular objectives which have a bearing on the judgment of material effectiveness or worth.

Implications of the widespread availability of evaluative information on instructional materials to users are foreseeable in this system. For instance, data gathering incorporated into this system could be undertaken for a discrete period (i.e., one month) by the nationwide network of regional Instructional Materials Centers (IMC) to provide systematic evaluative information. The data gathered through this technique could be pooled together to provide a large data file which could be used nationally from one center or duplicate files could be distributed to each regional center for dissemination to users.

Advantages to this system are twofold. First, data collection would not involve the Special Education Instructional Materials Center's (SEIMC) professional staff in continuous, year-round evaluative activity. Updating and enlarging the data file could be accomplished on an annual basis, one month of the year, therefore freeing SEIMC staff for research and development and stimulation of production activities 11 months of the year. Secondly, this procedure would increase a data file beyond what any one regional center could provide on its own, thus increasing the amount of evaluative information provided for each material. The result of this increase would give the user a larger spectrum of opinion and thus broaden his basis for decision. That is, if the request was answered utilizing a national data file rather than a regional one, the output would be based on a larger number of respondents or evaluators.

Regional SEIMC's should continue both phases of operation and evaluation. With the large number of instructional materials increasing rapidly, the collection of evaluative information must be prevented from becoming bogged down by slow and invalid data gathering procedures. The procedures outlined here provide rapid, reliable data collection and recovery which would meet goals presently in focus.

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Level II. TEACHER JUDGMENTS

Part C. Sequential Analysis as a Teacher Judgment Summarization Technique

SEQUENTIAL ANALYSIS AS A TEACHER JUDGMENT SUMMARIZATION TECHNIQUE

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While sequential analysis has been used in industrial situations such as quality control problems, its potential for education application is only just being recognized. The purpose of this section of the Evaluation SOURCEBOOK is to present one application of sequential analysis to the solution of educational problems. Specifically, the section will present the rationale for using sequential analysis for testing hypotheses about teacher evaluations of instructional materials, describe the procedure for application of sequential analysis to materials evaluation and summarize the results of several studies which have applied the procedure.

The Rationale for Using Sequential Analysis to Evaluate Teacher Opinions

The usual procedure for testing hypotheses about education phenomena is to determine, before the experiment is started, the number of observations required for accepting or rejecting the hypotheses. Sequential analysis, on the other hand, tells us after we have been making observations, when enough observations have been made to accept or reject the hypotheses with the risks we have chosen.

This reversed procedure makes sequential analysis particularly useful for dealing with educational problems and especially the problems of evaluating instructional materials. There are at least three reasons for advancing the use of *a posteriori* statistical inference procedures (sequential analysis) as a means of testing hypotheses in education. These are economy, inadequate knowledge of instruction and integrity.

Economy

Most experimental work in education uses *a priori* statistical inference to test hypotheses. *A priori* statistical inference specifies

ahead of time the numbers, classes and kinds of observations required to accept or reject a hypothesis. As indicated above, sequential analysis indicates when enough observations have been gathered to make a decision. According to Dixon and Massey (1951), only half the number of observations will be required on the average to make a judgment using sequential analysis as compared to the number required when the sample size is fixed before the experiment begins.

Dixon and Massey's statement about the comparative number of observations has been confirmed in a wide range of applications by the senior author. Similarly, the writers have found that using the criteria selected for three of the five studies to be reported below, hypotheses were accepted with approximately half the number of observations which would be normally stipulated in an a priori design.

Generally, simple a priori designs require a minimum of 30 observations for accepting or rejecting hypotheses. On the average, the studies on materials evaluation conducted by the authors required 15 observations to make a decision. In some instances, the decisions could be made in as few as nine observations.

The problems of time and expense, which must be a factor in using a priori statistical designs, can be minimized when using sequential analysis. Fewer observations require less time and less money. On this count alone sequential analysis requires that we examine its potential closely.

Inadequate Information

There is a wide range of variables which are assumed to be related to the educational process. We can readily identify and measure some of these variables. Others are less easy to describe precisely in objective terms. These variables are accepted as being related to the instructional process on the basis of folklore, bias and limited observations. This is as true of teacher opinions about what materials they are using and their effects as it is true of the instructional process itself. Sequential analysis presents a means of dealing with many variables which are related (actual or assumed) to the instructional process in spite of a lack of knowledge of all of the variables which are involved in the process.

The technique being advanced rests on one essential assumption. That is, it is assumed that in the absence of specific information about the antecedent conditions for a particular event being observed, the best guess is that these effects are random. If the events are not random, then successive observations will make this fact known rapidly.

In the case of teacher opinions about instructional materials, it is virtually impossible to identify, measure, and control all of the factors which might be related to teacher's judgment about the utility of a particular instructional material. Further, it is difficult to account for teacher-to-teacher variation. While conventional a priori statistical designs can be devised to attack the problem of teacher evaluation of instructional materials, such designs are expensive and time consuming and limited practical consequences can be anticipated.

Sequential analysis simply specifies the conditions and risks associated with accepting hypotheses and permits the experimenter to set about making observations at once. While sequential analysis as applied in the studies cited in this report lacks a certain usefulness in identifying the factors which might be related to teacher opinion, it does have an overwhelming pragmatic value. It describes what the opinions of teachers are--and it permits this to be done rapidly and efficiently. Objections that the technique does not take into account all significant related variables are without merit. The question is not "What are the factors which are related to teacher opinion?"; rather, the question is "What do teachers think of specific instructional materials?"

Because of the wide variety and large number of instructional materials which are on the market, and because of the necessity of helping teachers make decisions about the utility of materials in the classroom, a rapid efficient means of summarizing teacher opinion must be used. Sequential analysis has much to recommend itself for this purpose.

Integrity

A problem with a priori designs is applying them without disrupting the instructional process or even rendering it artificial. Since instruction is a process which is carried on in a certain context, it might best be evaluated by techniques which do not require radical modifications of that context. The application of sequential analysis makes this possible.

When applying sequential analysis and the specific design used in the materials evaluations studies to be reported below, no artificial conditions were created. Teachers simply used materials in the normal course of instruction. The possibilities of biases operating were minimized by a system of randomizing the selection of teachers who would try out the materials in their classrooms.

If no biases are operating, we would expect random or chance responses since each teacher might be using and evaluating materials in a unique manner. Under these conditions, it would be impossible to determine whether teachers thought the materials were satisfactory

or not. On the other hand, if a bias is operating in spite of random assignment of evaluations, then opinions should begin to systematically accumulate in either a positive or negative direction. If the teacher selection process has been truly random, then it is difficult to defend the assumption that the evaluations were a function of the kinds of teachers used, the sorts of schools they operated in, or the specific instructional techniques and procedures used.

Essentially, nothing is changed in the instructional activities engaged in by teachers except the introduction of a new instructional material. It would seem that the procedure being described in this section of the Evaluation SOURCEBOOK yields a fair evaluation of materials as they are used by teachers in their daily classroom activities.

Summary and Conclusion

The differences between a priori and a posteriori statistical inference have been summarized and the advantages of the latter as a procedure for evaluating instructional materials indicated. While sequential analysis tells little or nothing about the "true" value of a material (if there be any such thing), it does effectively and economically describe what teachers, using the material in the classroom, think of it.

Procedure for Using Sequential Analysis As a Means of Summarizing Teacher Evaluations

There are eight general steps for applying sequential analysis to materials evaluation. These are: (1) establishing the performance characteristics which constitute acceptance of the hypothesis that the materials are effective or ineffective, (2) establishing the risks the experimenter is willing to accept when either rejecting or accepting an hypothesis, (3) developing a data collection procedure, (4) selecting the materials to be evaluated, (5) selecting the evaluators, (6) processing the teacher evaluations, (7) making the decision, and (8) monitoring the evaluation. These steps will be discussed individually. While the procedure, in all probability, does not represent the only way to use sequential analysis when evaluating instructional materials, it has proven satisfactory up to this point in time.

Establishing Performance Characteristics

The specific application of sequential analysis used in this evaluation procedure is the test for proportions. Minimum and maximum parameter values were arbitrarily established. If teachers evaluated materials as satisfactory at least 80 percent of the time, the materials could be considered adequate enough to be recommended to

other teachers. On the other hand, if the materials were evaluated as being satisfactory only 50 percent of the time or less, then they could not be recommended to other teachers.

Of course, any alternative set of parameters can be established. These values seemed reasonable for piloting the procedure. Results of the first studies suggest that higher positive decision parameters could profitably be used in some situations.

Establishing Risks

The risk which the investigators were to take in committing a Type I error was such that the α level for the maximum parameter value (H_0) was .01. In the case of the minimum parameter value (H_1) the concern was greater for committing a Type II error. The α level was therefore set at .05. In essence, the writers had a greater concern for accepting a false hypothesis in the case of H_0, and a greater concern for rejecting a true hypothesis in the case of H_1.

Developing a Data Collection Procedure

Having established parameter values for H_0 and H_1, and having defined the amount of risk involved in accepting either hypothesis, the next step was to develop a chart for plotting the outcome of each observation. This is simply a matter of substituting the appropriate values in the following two equations and plotting the resulting lines on a chart suitable for recording the outcome of each observation. The equations are:

(1)
$$UE = \ln \frac{P_1}{P_0} + FE \ln \frac{1-P_1}{1-P_0} = \ln \frac{1-\beta}{\alpha} \quad H_0$$

(2)
$$UE = \ln \frac{P_1}{P_0} + FE \ln \frac{1-P_1}{1-P_0} = \ln \frac{\beta}{1-\alpha} \quad H_1$$

Once the chart is developed, it will look something like Figure 1. Observations are plotted horizontally if positive and vertically if negative. Each time an observation is made, three alternative decisions confront the observer. These are: to accept H_1, to accept H_0, or make another observation. If H_1 is accepted, teachers regard the material unsatisfactory as often as satisfactory. If H_0 is accepted, they regard the material satisfactory 80 percent of the time.

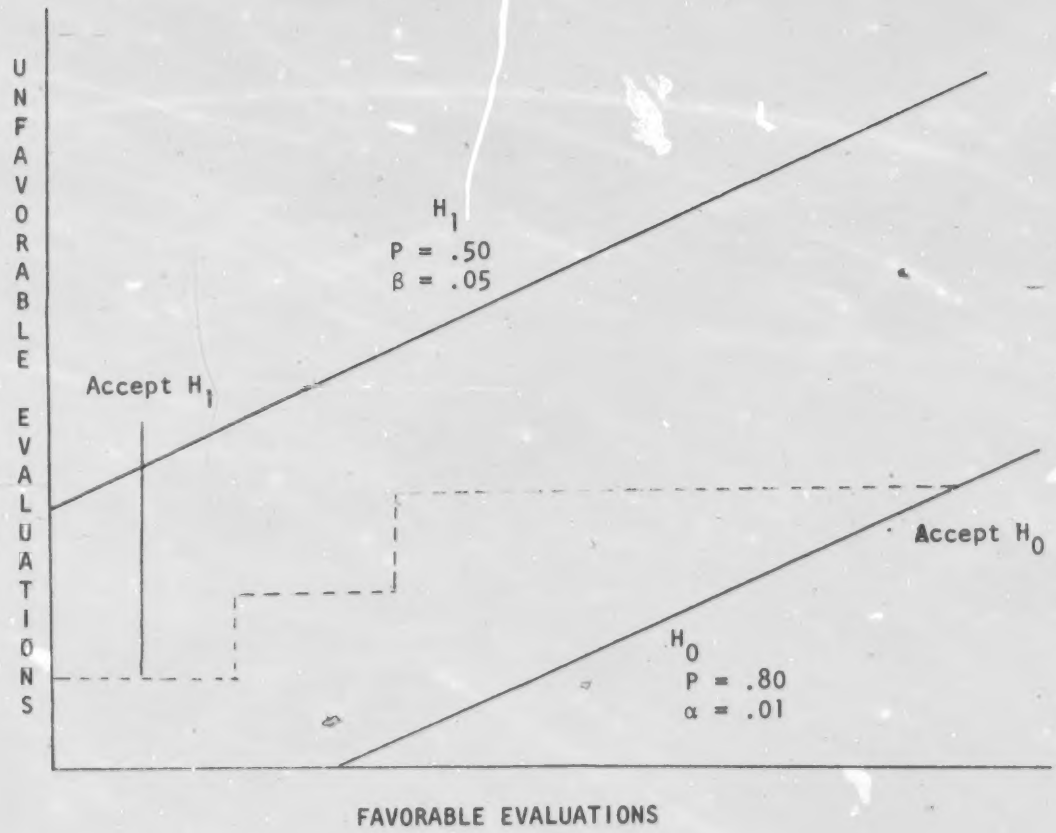
UNFAVORABLE EVALUATIONS
H_1
P = .50
β = .05
Accept H_1
Accept H_0
H_0
P = .80
α = .01
FAVORABLE EVALUATIONS

Figure 1.

For the purposes of the studies to be reported below, a standard matrix has been developed (Nelson and Schmidt, 1972) which has four sets of decision lines in one chart. Using such a chart, one can select any one of the several sets of criteria and plot his observation without calculating the decision points each time he starts an evaluation study.

The remainder of the data gathering system involves developing response forms for teachers to record their evaluations. These forms are developed for each material evaluated. Instruction manuals and other sources of information are used to derive statements about the behavioral objectives which the materials are assertedly useful for achieving. Behavioral objectives are determined for each material and/or media analyzed using the classification system discussed in Level I, Part C (see Rude, pp. 109-219). These behavioral objectives can be used, then, to evaluate at this level those materials and/or media. The teacher is requested to compare the material being evaluated with other materials which have been used for achieving the same objectives.

The response form allows for four categories of judgment ranging from unsatisfactory, compared with other materials used for obtaining the same or similar objectives, to superior. While four judgmental categories are allowed, they are treated statistically as two categories. Either the material is satisfactory or it is not. "Unsatisfactory" and "Fair" are treated as negative, and "Good" and "Superior" are treated as judgments reflecting satisfaction with the materials.

Each behavioral objective is processed separately and an overall evaluation is obtained. Thus, for any material evaluated, there will be as many evaluations plus one as the number of behavioral objectives which have been described in the Level I classification analysis.

Studies conducted to date have included several validity items. Validity items are statements of behavioral objectives for which the material was not expressly designed to achieve. If teachers were seriously answering the items on the response form, H_1 would be accepted in the case of each validity item. The problem with validity items is that it is possible that some teachers will find the materials useful to achieve the behavioral objectives developed by the experimenters. In addition, teachers will recognize that the behavioral objective is inappropriate and respond by making a comment to this effect rather than respond in terms of the categories provided on the response form. Because of these difficulties and the fact that other procedures have been developed to monitor evaluations, the validity item approach is no longer recommended.

Selecting Materials to be Evaluated.

Thus far materials selection has been restricted to those materials manufactured by companies willing to loan a sufficient number of copies to carry out the evaluation or to those materials which are placed in sufficient numbers of schools so as to permit enough observations required by the experiment. While there are problems with this procedure, lack of funds to purchase enough copies simply ruled out alternative approaches.

In order to fully implement the model, materials should be reasonable in price and be designed to generate observable behaviors associated with their use in the classroom. If the materials are reasonable in price, then it is possible to purchase enough copies to circulate them to teacher evaluators for trial and evaluation. In general, materials which purport to generate unobservable outcomes such as "positive attitudes toward society," or "positive self concepts" are inappropriate to this technique unless these inferred variables can be redefined in specific behavioral terms.

Selecting the Evaluators

For the studies of the Peabody Language Materials and the Frostig Materials, subjects were selected by sending appropriate evaluation forms to all persons in certain areas who were on the University of Southern California Instructional Materials Center for Special Education membership rolls. Teachers were asked to return the form unmarked if they had never used these materials. Those who had used the materials were requested to complete the evaluation form.

In as much as the System 80 equipment is expensive and not necessarily placed in all schools, a southern California sales representative was asked for a list of schools which had purchased the equipment. Evaluation forms were sent to all schools on the list.

Teachers were selected for the Bell & Howell study, the Tutorgram study, and the Tellor study on a random basis from all schools in the service areas of the 21 associate centers in the University of Southern California Instructional Materials Center for Special Education Associate Network. The procedure involved the development of a special random numbers table and special instructions for each associate network director as to how to use the table to select evaluators. Each associate center was assigned a specific number of evaluations in terms of the proportion of the total population of teachers in the influence spheres of all associate network centers in a particular center.

Associate center directors not only drew the samples, but were responsible for circulating the materials and retrieving the evaluation forms when completed. The responses were processed by the writers.

All in all, the procedure used in evaluating the several materials evaluated to this point involved a large number of teachers in widely distributed geographic areas and working in a wide range of instructional situations. This is desirable in terms of the logic of the system. It most certainly lends credence to the statement that teachers think such and such about instructional materials.

Processing Teacher Evaluations

Given the system described, the problem of processing teacher evaluations was simple to deal with. Evaluation matrices were prepared for each behavioral objective for which the material was being evaluated. Reports were simply entered into the matrices in the order received. Although it would have been possible to stop sampling when the matrix plot crossed a predetermined decision line, the investigators continued to plot in order to determine if changes in response trend might have occurred after H_1 or H_0 had been accepted. In no case did this occur.

Making the Decision

After having entered the results of evaluations for each objective for which teachers evaluated the materials, the decision process was simple. If the plot crossed the line representing H_0, then the materials could be regarded as acceptable by teachers 80 percent of the time. If the plot crossed the line representing H_1, then the materials could be regarded by teachers as unacceptable 50 percent of the time. If the plot crosses neither line, then no decision could be made.

Monitoring the Evaluations

The evaluations can be quite easily checked. By computing an average sample number curve for a given proportion, it is possible to calculate the mean number of samples (observations) which are required to achieve a decision if the given proportion is the true value. This calculation, in the case of $P = .80$ equals 15 observations with a standard error ranging from nine trials to 36. So long as the number of trials to reach decision lies between these two points, decisions are probably valid. If the trials required to reach decision exceed these points, there is reason to suspect the evaluations. It goes without saying that the average sample number and its accompanying standard error varies with different proportion values.

Results of Studies Conducted Using Sequential Analysis

Sequential analysis was used to summarize teacher opinions about the Peabody Language Materials (1969), the Frostig Perception Development Materials (1969), the Bell & Howell Language Master: Nouns Program (1973), the Tutorgram: Vowels Program (1973), the System 80 Materials (1973) and the Tellor Consonants Program (1973). Since there isn't sufficient space to discuss each of these studies, it may be in order to simply list them and make some general comments. The reader can examine each of the reports at his or her convenience. All reports are available at the University of Southern California Instructional Materials Center for Special Education.

In general, the evaluations of all of these materials except the Frostig were positive. The technique used made it possible to identify specific deficiencies in each of the materials, as viewed by the teachers sampled. The Evaluation Monitoring System was used with all studies commencing with the Bell & Howell Language Master Study. In each instance, the predicted Average Sample Value corresponded with the obtained value--suggesting that obtained values and population values were the same and that the evaluations were valid.

Experience with the above studies indicates that sequential analysis is not only a viable procedure for evaluating materials, but an economic one in that it makes possible the evaluation of a number of materials in a relatively short time frame.

Summary

The rationale for applying sequential analysis to materials evaluation problems was discussed. The sequential analysis procedure and its use in summarizing teacher opinions about instructional materials was reviewed. In addition, a working model for an on-going materials evaluation program which relies on teacher opinion was described. Finally, the high points of six evaluation studies using sequential analysis was presented.

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Level III. EXPERT JUDGMENTS

Part A. Procedures for the Identification of Exemplary Materials Criteria

PROCEDURES FOR THE IDENTIFICATION OF EXEMPLARY MATERIALS CRITERIA

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Introduction

The vast and growing number of instructional materials and media available in greatly varying quality necessitates a system for identifying criteria for selecting the "best" materials in various subject matter areas to be included in libraries (e.g., Special Education Education Instructional Materials Centers (IMC), Regional Media Centers for the Deaf (RMC) and Regional Resource Centers (RRC) libraries). If poorly conceived and developed instructional materials can be excluded from libraries and materials that are deemed exemplary can be included in libraries, then the time and effort of many teachers and pupils being spent in the use of inferior products can be saved. The intent of the proposed activities outlined below is: (1) to identify criteria upon which materials may be judged exemplary, and (2) to identify exemplary materials in various subject matter areas. The strategy to accomplish this is to solicit appropriate information from experts.[1] The steps suggested for this may be found in the Procedures section.

When the criteria are established for the various subject matter areas and information is obtained regarding variables teachers use to select materials (see Latham, Level II, Part A, pp. 220-231; Dobbert, Level V, Part A, pp. 404-414; and Swassing, Level V, Part B, pp. 415-432), it will be possible to identify any discrepancies between what experts view as essential in establishing the worth of instructional materials or media and what teachers (curriculum specialists, principals, or those responsible for materials selection) view as essential. Discrepancies that occur suggest a need for re-examination of the essential criteria by both the teacher and the expert. Interactions between these two groups can result in the identification of better criteria for the selection of instructional materials than has previously been available. It will also be possible to identify criteria which are generic across subject matter areas and those which are subject matter specific. Such information may lead to objectification and simplification of the instructional materials

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[1] Experts: curriculum specialists, subject matter specialists, instructional developers, etc.

selection for libraries.

Procedures

Once the subject-matter area of concern is identified, computer files[2] will be searched for individuals (10) with relevant expertise. Balance in subject-matter expertise, programmatic specialty and philosophic orientation is to be attempted within the task group.

Phase I

The initial task will be for each expert in the task group to select independently those materials (at least three sets, but no more than five) which he feels represent "best" the essentials of the specific subject-matter field. When these are identified, he is to specify in writing the characteristics[3] of each of the selected materials that make them exemplary.

Reports from these 10 experts will identify a number (some number less than 50) of "exemplary" instructional materials in the subject-matter specified and the characteristics that identify them as exemplary. Since the quality of such reports is bound to vary, only the experts (say five) with the best quality reports would be utilized in the second phase of the materials criteria identification procedure.

Phase II

Each of the experts remaining for Phase II would be sent all 10 of the original reports with the instructions to review them with respect to constructing a single set of criteria for the selection of materials. Once this is done, a meeting would be called to hammer out differences and to construct a single set of criteria. If there are incompatible ideas and agreement cannot be reached, the opposing sides

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[2]While no appropriate list exists, it is assumed that such a list would be constructed through nominations from professional organizations such as ASCD, AAAS, AAMD, AECT, NSPI and others. The computer file would include (1) names, (2) institutions, (3) recommendations and (4) work done in the curriculum construction and instructional development areas. Experience in constructing similar files in the Network (EXSPEED of Colorado and the Resource Book of Kansas) would be used to the fullest extent possible.

[3]It is envisioned that the framework for expert judgment would utilize an adaptation of Armstrong's Professional Judgment Evaluation Form.

will be asked to submit position papers. The documents constructed in Phase II will be refined in Phase III to accommodate special needs associated with the various handicapping conditions.

Phase III

Phase III will utilize Network personnel and/or consultants with expertise in each relevant handicapping condition. Their responsibility will be to review the criteria constructed in Phase II and indicate what modifications or additional criteria must be included to make the criteria relevant to the selection of materials for children of the various handicapping conditions (e.g., for instructional materials in many areas of the deaf, the primary message must be carried by visual stimuli). Furthermore, this task group will review the list of exemplary materials identified to determine which of these may be appropriate for each type of handicap (e.g., will the materials or media work with deaf children as is, will they require adaptation, or are they completely inappropriate). Materials that are inappropriate for one handicapped type may be effective with another. Thus, information regarding appropriateness of each exemplary instructional material or media for given handicapped populations is essential.

After careful construction of the materials selection criteria, there still remains a need to submit the criteria to other subject-matter and special education experts to establish broad agreement and provide cross-validation. Upon completion of the materials criteria construction task for each subject-matter area, an analytic summarization of the information is compiled and recommendations regarding materials selection are made.

Summary

In summary the basic steps are:

Phase I: Exemplary Materials Identification and Initial Criteria Construction.

(1) Identify and select experts from a computerized file.

(2) Have experts identify three to five exemplary materials in the subject-matter area specified.

(3) Have experts document the materials characteristics selected which make the materials exemplary.

(4) Delimit the number of participating experts for Phase II on the basis of the quality (e.g., clarity, conciseness, completeness) of the submitted documents.

(5) Send all original reports to each of the remaining experts to review with respect to constructing a common materials selection criteria list for a given subject-matter area.

Phase II: Common Materials Selection Criteria Construction.

(6) Conduct meeting of experts to establish a common materials selection criteria list. Proponents of incompatible ideas, if any, submit position papers.

Phase III: Additional Criteria Associated with the Type of Handicap.

(7) Identify and select individuals with expertise in the various handicapping conditions.

(8) Given the list of exemplary materials identified in Phase I, the "experts" selected will identify (a) which of these materials are appropriate for the handicapped population they represent, (b) which would be appropriate with minor modification, and (c) which are deemed entirely inappropriate.

(9) From the above exercise and from past experience, the special education experts will identify modifications and additions to the materials selection criteria that make them appropriate for the handicapped population they represent.

Phase IV: Validation.

(10) Cross-validate the criteria established by submitting them to other subject-matter and special education specialists for critical review.

(11) Analyze and summarize the information obtained and make recommendations for materials selection.

Level III. EXPERT JUDGMENTS

Part B. Appraisal of Instructional Materials and Media by Experts

APPRAISAL OF INSTRUCTIONAL MATERIALS AND MEDIA BY EXPERTS

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Professional judgment has been used most frequently by accreditation agencies in evaluating university and school programs (Glass, in press). Unfortunately, these professionals have not been attentive to critical criteria (e.g., they have too frequently focused on the number of square feet in a room or the number of accumulated credits in specific courses rather than looking at how the square footage provided is used or how well courses are taught). Similarly, the accreditation agencies have used only "evaluation by experts" rather than using this as one element of critical information to be garnered for the evaluation of programs. Even so, expert appraisals provide both a valuable and unique source of information which can be used to make decisions about the use of instructional materials. The issue is not whether instructional materials should be reviewed by experts, but rather how expert appraisals should be solicited and from which experts.

The review of instructional materials by experts has been established as a valuable approach for appraising the strengths and weaknesses of materials in different areas. It has been shown, however, that appraisals can best be obtained from experts by using some standard analytic device for highlighting critical elements (e.g., objectives and standards) to be considered as the materials are reviewed (Stake, 1970). Perhaps the greatest criticism which has been levied against expert appraisals in other areas (i.e., tests) (Buros, 1965), is that the reviewers were not guided by a checklist or a common set of standards. The expert needs protocols, guides, or routines, to alert attention to a predetermined schedule of the important features (Stake, 1970). Several such guides have been provided to reviewers by curriculum development projects for the handicapped (Cawley, 1973; Taylor, 1973).

Experts by Area of Expertise

Another critical factor in the gathering of appraisal information from experts is expert by question match (i.e., who do you ask what). First, experts will vary in their level of expertise in certain areas (i.e., you should not ask a mathematician about the scope of a course in English literature). Second, experts will differ in their philosophical orientation or value structure and their responses will

vary as a function of their orientation. Therefore, it is important to determine a priori to soliciting information the sample of experts who will be surveyed.

Experts can only provide valid information or appraisal on instructional materials and media factors which they know about. Examples of particular types of experts, their areas of expertise, and the potential instructional materials and media areas of query in which they might offer reasonable judgments are shown in Table 1. This listing provides a beginning guide to the selection of experts for particular appraisal tasks. Since the elements to be appraised will vary, the selection of experts must vary on the basis of that change.

Experts by Values

Of importance as well in the selection of experts for any evaluative study is the value positions of the experts. When gaining appraisal information, it is important to know from what value perspective the information is being provided.

A beginning step toward the determination of value structures and philosophical orientations toward education has been provided (see EPIE, 1972). By asking experts to respond to this form they can be classified as to at least certain orientations. In this way, if the evaluator wishes to obtain judgments which reflect several different philosophical orientations, it is possible. The value positions provided for in the Educational Product Information Exchange (EPIE) (1972) assessment are shown in Table 2.

Procedures

The first step in the process is to identify the specific areas of program concern (i.e., programming, content accuracy, curriculum organization, concept modeling) about which expert judgments are needed. A general form to solicit expert or professional judgments of a specific material or program relative to intents of the program (i.e., information dissemination or perceptual motor development), content dimensions (i.e., content accuracy, content sampling, and content organization), programming dimensions (i.e., repetition, practice, presentation, clarity, level of abstraction, clarity of language, etc.) is provided in Appendix A. If after perusing the form it is acknowledged that these are the areas of program concern, then experts can be selected to fill out the form for the material or program under test.

The second step is to select experts who in your opinion are knowledgeable in the areas of expertise necessary for adequately responding to the questions being posed about particular materials

TABLE 1

MATCHES IN EXPERTS AND AREAS OF EXPERTISE

Expert	Area of Expertise	Questioning Areas
Mathematician	Mathematics	Content accuracy in mathematics; scope of mathematics program; selection of content
Mathematics Educator	Mathematics Education	Curriculum sequencing; curriculum organization; instructional modeling
Learning Theorist	Skinner	Operant techniques; reinforcers within the instructional material; reinforcement schedules imbedded within the material
Special Educator	Mental Retardation	Information break-ups for processing; pacing; sequence; cueing-fading
Curriculum Developers	Task Analysis	Sequencing of tasks in different subject-matter areas and psycho-motor processes; structuring of curriculum around task sequences
Curriculum Developers	Media	Decisions relative to what medium (audio-visual-person-materials) to use in designing a program
Developmental Theorist	Piaget	Placement of concepts and tasks; modeling of concepts and tasks

TABLE 2

PHILOSOPHICAL ORIENTATION AND EXPECTED BIASES OF JUDGMENT

Area	Value Orientation
Human Development	Behavioral-environmental
	Interactional
	Nativist-maturational
Curriculum	Information Dissemination
	Process Development
	Socialization
	Emotional Growth and Development
Education	Direct
	Vicarious

and/or programs. A comprehensive computer file of professionals with expertise in a variety of areas should soon be available for access (see Curtis, Level III, Part A, pp. 255-259). From this file experts can be selected.

Once the experts have been screened for areas of expertise, the EPIE (1972) value orientation forms should be provided for the selected individuals to respond to. This data should be analyzed to classify the experts as to value position. This information can be used to update the computer file of professionals for future selection.

Since little is known from an empirical base relative to the interaction between judgmental response and value orientation of the respondent, data should be collected to determine whether any correlates of significant note are to be found. If after use it appears that value positions are not significant, then either the tests assessing value positions or this portion of the selection criteria can be deleted.

Summary

Systematic data collection, analysis and reporting in the area of expert appraisal of instructional materials and media has been somewhat limited. One of the reasons for this is the expected invalidity of judgments obtained. Invalidity, however, has derived from two major sources. First, experts have not always been asked questions selectively to match their areas of expertise. Second, experts have not been provided with a set of guidelines for reviewing instructional materials. Procedures are provided herein which are expected to alleviate at least these two sources of invalidity. Only through the use of these procedures can information relative to the value and validity of expert appraisals obtained under these methods be judged.

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APPENDIX A

PROFESSIONAL EVALUATION FORM

Unique Identification Number _____

Author(s) _____

Name of the Program/Material _____

Level of the Program/Material _____

Publisher _____ Year Published _____

Crossvalidation of Classification Information

1. The primary intent of this program is

___ a. to disseminate information (i.e., designed to teach content or subject matter);

Specifically:

___ 1) Mathematics

___ 2) Reading

___ 3) Language

___ 4) Science

___ 5) Social Studies

___ 6) Other; Specify _____

___ b. to improve the functioning of a sensory input channel;

Specifically:

___ 1) Auditory

___ 2) Visual

___ 3) Kinesthetic

___ 4) Haptic

___ 5) Other; Specify _____

___ c. to improve motoric functioning;

Specifically:

___ 1) Gross

___ 2) Fine

___ 3) Other; Specify _____

If you checked "a" on question number one, answer the questions in Sections A and B which follow. If you checked "b" or "c" on item one, skip these items and respond to the items in Section C, page 10.

A. Content Dimensions:

1. Content accuracy; are there any inaccuracies of content?

___ No

___ Yes; note the inaccuracies and indicate page numbers or other appropriate markers.

_____

_____

_____

_____

2. Content sampling; are there any major content areas omitted?

___ No; specify areas present _____

_____

_____

_____

___ Yes; specify areas omitted _____

_____

_____

_____

3. Content organization; the organizing principles of the content in the program are

___ Logical; specify _____

_____

_____

_____

___ Illogical; specify organizing center and why it is an illogical organization of the content.

_____

_____

_____

_____

4. Sequence of content; the facts, principles and generalizations as presented in the program are ordered.

___ Logically; specify _____

_____

_____

_____

___ Illogically; specify _____

_____

_____

_____

B. Programming Dimensions

1. There is a systematic review and repetition in the presentation of facts, principles and generalizations

___ Yes; comments _____

_____

_____

_____

___ No; comments _____

_____

_____

_____

2. Practice is provided for the development of each skill introduced

___ Yes; comments _____

_____

_____

_____

___ No; comments _____

_____

_____

_____

3. The presentation of the concepts is

___ Clear; comments _____

_____

_____

_____

___ Unclear; comments and exemplars _____

_____

_____

_____

4. The abstraction level is appropriate for what developmental period (CAs on a normal growth curve); circle the appropriate range

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

Comments _____

_____

_____

_____

5. The language of the presentation

___ Clear; comments _____

_____

_____

_____

___ Unclear; comments _____

_____

_____

_____

6. Estimate the percentage requirement for use of each of the following sensory input channels;

They should total 100%

Auditory _____ % Kinesthetic _____ %

Visual _____ % Tactual _____ %

Other _____ %; specify _____

7. There are a variety of activities provided

___ Yes; comments _____

_____

_____

_____

___ No; comments _____

_____

_____

_____

8. The program requires active participation and involvement on the part of the learner

___ Yes; comments _____

_____

___ No; comments _____

_____

9. What academic skills are required for program completion?

___ a. Reading; what level?* _____

___ b. Arithmetic; what level? _____

___ c. Other; specify _____; what level? _____

10. What perceptual-motor skills are necessary for program completion?

___ a. Auditory; what range of development on the normal CA scale? _____

___ b. Visual; what range of development on the normal CA scale? _____

---

*On a normal grade level base.

___ c. Kinesthetic; what range of development on the normal CA scale? _____

___ d. Tactual; what range of development on the normal CA scale? _____

___ e. Other; specify _____

What range of development on the normal CA scale? ___

_____

11. Does the program make use of cueing to facilitate the learning process?

___ Yes; specify _____

_____

_____

_____

___ No; comments _____

_____

_____

_____

___ Not appropriate; comments _____

_____

_____

_____

12. Are the concepts as presented in the program ordered from easy to difficult?

___ Yes; comments _____

_____

_____

_____

___ No; specify _____

_____

_____

_____

13. Are all of the concepts which are necessary in the instructional sequence present in the program?

___ Yes; comments _____

_____

_____

_____

___ No; specify _____

_____

_____

_____

14. Is the pace of the presentation appropriate for the developmental range of the material?

___ Yes; comments _____

_____

_____

_____

___ No; comments _____

_____

_____

_____

15. Make any other comments which you feel are important in the evaluation of this program.

If you checked "b" or "c" on item one, respond to the items in Section C.

C. Perceptual-Motor Development:

1. What specific activities in this program are suggested to promote improvement in a perceptual-motor skill?

_____

_____

_____

_____

_____

2. Rate the effectiveness of each activity in improving a specified perceptual-motor skill.

a. Activity #1 (Listed in Question 1 above)

_____

_____

_____

_____

_____

Perceptual-motor skill

_____

_____

Effectiveness

0 1 2 3 4 5

totally useless — very effective

b. Activity #2

_____

_____

_____

_____

_____

Perceptual-motor skill

_____

_____

Effectiveness

0 1 2 3 4 5

totally useless — very effective

c. Activity #3

_____

_____

_____

_____

_____

Perceptual-motor skill

_____

_____

Effectiveness

0 1 2 3 4 5

totally useless — very effective

d. Activity #4

_____

_____

_____

_____

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Perceptual-motor skill

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Effectiveness

0 1 2 3 4 5

totally useless — very effective

e. Activity #5

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Perceptual-motor skill

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Effectiveness

0 1 2 3 4 5

totally useless — very effective

f. Activity #6 Perceptual-motor skill

Effectiveness

0 1 2 3 4 5

totally useless — very effective

3. Make any other comments which you feel are important in the evaluation of this program.

D. Evaluative Comments about the Form:

1. Make any evaluative comments about the form you have completed which you feel will be helpful in their revision.

2. How long did it take you to complete all of these forms?

Definition of Terms

AUDITORY--the sensory input channel monitored by the ear; hearing; sound.

VISUAL--the sensory input channel monitored by the eyes; seeing, print.

TACTUAL--the sensory input channel monitored by close skin nerve endings; touch.

KINESTHETIC--the sensory input channel monitored by sensory receptors within the muscles, joints and tendons.

GROSS MOTOR--coordination of large body movements which involve the total musculature of the body or large portions of it; particularly, the large muscle groups.

FINE MOTOR--coordination of small movements of the body.

CONTENT ACCURACY--coorectness of facts, principles and/or generalizations of subject matter fields as portrayed in the program (i.e., "The commutative property for addition is exemplified by this equation $(a + b) + c = a + (b + c)$"; this statement is a content inaccuracy. A correct statement of fact is: "The commutative property for addition is exemplified by this equation: $a + b = b + a$.

CONTENT SAMPLING--a representative selection of all major areas of the subject matter discipline. For example, mathematics includes the areas of arithmetic, geometry, algebra. Complete content sampling would include information from all of these areas.

LOGICAL CONTENT ORGANIZATION--the layout in the program of the facts, principles, and generalizations such that their interrelated nature within the body of knowledge is highlighted (i.e., the arithmetic fact $2 + 2 = 4$ can be geometrically portrayed on the number line $\underset{0 \quad 1 \quad 2 \quad 3 \quad 4}{\underline{\hspace{6em}}}$. A logical organization of content capitalizes on this relationship. The organizing center in this instance would be the mathematical operation: addition.

LOGICAL CONTENT SEQUENCE--the facts necessary for the deduction of a generalization or principle are presented in either a systematic inductive or deductive order (i.e., inductive order for commutative property generalization: $2 + 3 = 5$; $3 + 2 = 5$; $6 + 8 = 14$; $8 + 6 = 14$; etc.) The order of the addends does not change the sum. Deductive order for commutative property generalization: The order of the addends does not change the

sum. 2 + 3 = 5; 3 + 2 = 5; 6 + 8 = 14; 8 + 6 = 14; etc. Illogical order in program layout: 2 + 3 = 5; 6 + 8 = 14; the order of the addends does not change the sum. 8 + 6 = 14; 3 + 2 = 5.

CUING--utilizing a previously learned discrimination to highlight a new discrimination to be made (e.g., if color discrimination has been learned and shape discrimination is to be learned, all similar shapes are made the same color, thus, "cuing" via color the discrimination of shape).

Level IV. EFFECTS ON LEARNERS

Part A. Optimizing Cooperative Teacher Behaviors in the Field Test Setting

OPTIMIZING COOPERATIVE TEACHER BEHAVIORS IN THE FIELD TEST SETTING

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Introduction

A substantial amount of information is presently available (Berman, 1972; Bloom, et al., 1972; Hayden, et al., 1972; Junkala, 1972; Lumsdaine, 1965; Medley, et al., 1963; Paulson, 1970) which documents various evaluation and field test models useful for determining the effect of instructional materials upon learning. Even so, relatively little has been written about the preparation of teachers in order to optimize their cooperativeness as participating field testers prior to the field testing. Apparently teachers are chosen to participate in field tests and evaluation projects on the assumption that the teachers who serve as field testers will do so with no other reinforcers than the implicit belief that whatever they are doing with the instructional materials being field tested must be "good for children."

Experience has taught us, however, that teachers sometimes do not cooperate optimally with the developer in field testing instructional materials. Experience should have also taught us that as often as not, the teachers' reasons for not cooperating optimally are, for a variety of different reasons, justifiable. Unfortunately, to the extent that optimal teacher cooperation is not obtained, the field testing of the instructional material suffers, in the sense that the collection of accurate and reliable information regarding the important characteristics of the instructional material is jeopardized.

Since it seems reasonable to assume that the majority of teachers are dedicated to the general social and educational betterment of their students, it follows that there must be other problems that interfere with the attainment of optimally cooperative teacher behaviors during the field testing of instructional materials. It behooves us then to determine as best we are able the nature of these problems and to develop procedures to obviate them prior to the initiation of the field tests in order to optimize cooperative teacher behaviors in the fiest test setting. Put another way, what is needed is a procedure which will minimize the potentially aversive characteristics of the instructional materials and/or the field test procedure itself for the teachers cooperating in the field test. The purpose of this paper is to describe the development and application of such a procedure and to provide some data regarding the

effectiveness of the procedure. The data provided are necessarily incomplete, since the field test project described is still in process.

Description of the Project

The project described herein was concerned with the development of a field test procedure suitable to evaluate a collection of 25 instructional programs (Anderson and Hodson, 1973) developed for use with severely handicapped students (e.g., students with labels like "trainable," "autistic," "brain damaged," etc.). The instructional programs were primarily developed and validated by several educational centers serving severely handicapped students and were made available to our project for field testing by these centers. All of the instructional programs were developed according to operant or behavior modification principles. The evaluation data provided with the instructional programs regarding student learning left little doubt regarding the effectiveness of the program.

The instructional programs to be field tested were selected for this field test so that they would correspond as closely as possible to the results of a needs survey (Foster, 1972) which attempted to identify specific behavioral problems and deficits of the same students served by the teacher who would serve as field testers in the project. The needs survey, which was completed prior to the initiation of the field testing, used the Adaptive Behavior Scales (Foster, et al., 1968) as its primary instrumentation and was conducted by the teacher's employing agency.

The services of these teachers as field testers were offered to our project by their employing agency, in return for which the employing agency was provided with final copies of the field tested instructional programs. Informal discussions with several of these teachers indicated that they were generally unaware of the nature or extent of the involvement they were to have in field testing the instructional programs.

The teachers who cooperated in the field testing were all teachers of severely handicapped students. Their educational background varied from completion of the 12th grade to near completion of the doctorate, with the majority having at least a bachelors degree in special education or a closely related field. Overall, these teachers provided educational services to over 2,000 severely handicapped students in a variety of non-residential settings.

Support to the cooperating teachers prior to and during the field testing of the instructional programs was provided by a team of consultants trained in behavior modification techniques who were employed by the teacher's employing agency. This team of consultants

trained each of the teachers in behavior modification techniques prior to the start of the field tests of the instructional programs using materials previously developed by our project staff (Anderson, et al., 1972). This phase of the project is referred to hereafter as the pre-field test phase. In addition, this team served as consultants to the cooperating teachers throughout the field test procedure to assist them with problems they encountered using the instructional programs.

Preparation of the Instructional Programs

The instructional programs were modified prior to field testing by our project staff, which consisted of two professionals with advanced degrees in behavior modification. Each of the project staff members had had clinical and/or classroom experience in working with severely handicapped children.

In a more or less traditional manner the first phase of the instructional program modification was oriented towards standardizing the characteristics of the instructional programs. That is, we modified each instructional program so that it included: (1) appropriately stated behavioral objectives which indicate the behaviors the instructional programs were designed to teach; (2) a description of the prerequisite behaviors that the student should have before he could be successfully taught the program; (3) pretests to determine the student's entry level behavior; (4) recording devices to record the student's progress through the instructional program; (5) recycling instructions for students who failed any of the steps in the instructional program; (6) alternate instructional techniques for students who still failed the steps in the instructional program after completing the recycling procedure; (7) posttests to determine the student's exit level behavior; (8) generalization techniques designed to maintain the student's behavior once he acquired the behavior taught by the instructional program.

The primary question regarding the instructional programs at the completion of the first phase of the modification was: could they be used as effectively by teachers lacking in substantial experience with applied behavior management techniques who worked in situations markedly dissimilar to those in which most of the instructional programs were developed?

A second question of equal importance was: now that the instructional programs had been modified as described above, could our project staff develop a procedure that would result in the minimalization of the potentially aversive characteristics of the instructional programs and the field test procedures such that we could be reasonably sure that the teachers serving as field testers of the instructional programs would be optimally cooperative?

In order to provide an answer to this question, we first had to develop a roster of what we thought were the potentially aversive characteristics of the instructional programs and the field test procedures that we wished to minimize. To accomplish this, the project staff "brainstormed" until a roster of all of the types of problems that we thought the teacher might encounter when using the instructional programs within the field test project was developed. The resulting roster was disappointingly long, leaving the project staff somewhat concerned about the potential success of the upcoming field tests. Continued refinement of the elements on the original roster finally led to the elimination or combining of the several roster elements into the six general elements listed below. No claim is made here that the elements in this roster are exhaustive of the potentially aversive characteristics which might interfere with obtaining optimally cooperative teacher behavior. No doubt others will be able to expand upon this roster to better fit their own field test setting and we encourage them to do so. There were six elements which remained in the final roster of potentially aversive characteristics of the instructional programs and the field test procedures.

The field test teachers will find: (1) the field testing procedure aversive unless they are reinforced for cooperating in the field test procedure; (2) the instructional programs aversive if the instructions in the programs are not familiar; (3) the instructional programs aversive if the instructions in the programs are not precise; (4) the instructional programs aversive if the instructions in the program are not complete; (5) the instructional programs aversive if they are not seen as being relevant to their classroom situation; (6) the instructional programs aversive if they are not believable when judged against the teacher's previous teaching experience with severely handicapped students.

In short, we felt that we could minimize the potentially aversive characteristics of the instructional programs and the field test procedures if we assured that: (1) the teacher was reinforced for her cooperation; (2) the instructions in the programs were familiar, precise and complete; and (3) the programs themselves were relevant and believable. The manner in which our staff approached the modification of the instructional programs and field test procedures during this second modification phase and some of the results obtained during the field testing of the instructional programs are discussed in the following section.

Reinforcement for Cooperation

The first and most readily available reinforcer suggested by our project staff for the teachers was improvement in their student's skills. That is, it was suggested that student skill improvement might

be sufficient to maintain cooperative teacher behaviors during the field testing of the instructional programs. Unfortunately, there is some evidence that student skill improvement in and of itself is not always a sufficient reinforcer for either teachers (Graubard, et al., 1971; Johnson, 1971; Skinner, 1965) or their administrators (Haughton, 1967; Sloane, 1971). Consequently, other reinforcers were also sought for use in conjunction with student skill improvement.

Discussions with some of the teachers and their administrators indicated that teachers would like to earn college credit for participating in the field tests. Accordingly, we arranged with an extension division of a local college for each participating teacher to receive college credit for participating in the field testing of the instructional programs. For those teachers who did not want college credit, re-certification credit for their cooperation in the field testing was arranged through the State Department of Education. Tuition costs were paid for, in most instances, by the teacher's employing agency.

In addition to the college credit, each cooperating teacher was provided with a personal set of all of the instructional programs used during the field tests. The cost of these instructional programs was paid by the teacher's employing agency.

In order to receive credit for participating in the field test, teachers had to use at least one of the instructional programs with a minimum of one of their students and report the results along with a description of any concerns they had about the instructional program to the behavior modification specialists mentioned previously. Each cooperating teacher was advised that the grade (pass/fail) received for the course did not depend in any way upon the correct teaching the behavior in the instructional program to the student(s). Rather, entire grade was made contingent upon using the instructional program with one or more students and reporting the results to the behavior modification specialist.

The response to the offer of college credit for participating in the field testing was enthusiastic as evidenced by the fact that the majority of the eligible teachers signed up to participate in the field testing of the instructional programs. During the first stages of the field tests, a considerable amount of concern was expressed by some of the teacher's administrators, regarding their feeling that the requirements for the teachers to successfully pass the course should be more stringent. Specifically, some administrators felt that the teachers should be required to successfully teach a behavior before being allowed to pass the course. To this concern, we pointed out that we considered the teacher's failure to teach a behavior to be as much, if not entirely, due to a fault in the design of the instructional program as the fault of the teacher. Consequently, we felt it would

be unfair to penalize the teacher for failing to successfully teach students the behavior if the instructional program itself proved to be faulty. Furthermore, we felt it was as valuable to identify those instructional programs that didn't work as it was to find those that did. With varying degrees of reluctance, the administrators finally agreed with this rationale. To date, all of the teachers who signed up to participate in the field testing have satisfied the requirements for the course. That is, each has used a minimum of one instructional program and reported appropriately thereupon.

Unfamiliar Instructions

By familiar we meant that the technical terms in the instructional programs should be understood by the cooperating field test teachers. In order to minimize this potentially aversive characteristic, the project staff reviewed each instructional program prior to the field tests. The technical terms used in the instructional programs were examined to insure that they were not different from those terms the teachers learned in the pre-field test training.

Interestingly enough, the major problem we encountered here came about because we failed to include certain technical terms in either the pre-field test training or the instructional programs. For example, in several of the instructional programs the target behavior is taught backwards. That is, the behavior is taught backwards beginning with the last step first and proceeding until the first step is taught last. Thus, a program designed to teach a student to put on his pants required that the student begin with pants already pulled up to within 3 inches of his waist. From there he is instructed to "pull up his pants." The second step begins with the pants 6 inches below the waist from where he is again instructed to "pull up his pants." This procedure is followed until the student pulls up his pants from his toes.

Technically, teaching behavior in this fashion is referred to as "backwards chaining" (Sulzer, et al., 1967). We thought that the concept of backwards chaining would be confusing so we omitted any reference to it in the pre-field test training or the instructional programs. That was a mistake! Several teachers quickly pointed out that certain of the instructional programs must have been printed backwards and consequently they reversed the steps in the instructional programs and tried to teach the behavior in the traditional manner. Accordingly, we modified those instructional programs which used the backwards chaining procedure so that they included a brief description and rationale for backward chaining and expanded the training materials used in the pre-field test training to include the concept of backward chaining.

Similarly, it was found that several of the teachers had some

familiarity with certain basics of the behaviorist technical language and consequently they experienced some difficulty when they tried to establish equivalence between the technical terms they already knew and the technical terms they encountered in the pre-field test training and the instructional programs. For example, teachers wondered if the term "negative reinforcement" was identical to the term "decelerating consequences." Accordingly, we developed a glossary of commonly used synonyms to the technical terms used in the instructional programs and incorporated this glossary in the pre-field test training materials and the instructional programs.

Imprecise Instructions

By precise it was meant that the instructions in the program should communicate as clearly as possible the behaviors that the teacher and the students were to engage in. Our project staff attempted to guarantee that program instructions were precise by using the following three techniques: (1) the instructional programs were read to each other, (2) selected instructional programs were tried out with our own or other readily available children, and (3) the use of the instructional programs was role-played by ourselves or with each other.

Incomplete Instructions

By complete we meant that no skills would be required of the teacher to correctly use the instructional programs over and above those taught in the pre-field test training phase. Although the project staff reviewed each instructional program prior to field testing in order to ensure that no additional skills were required, during the field testing, this element resulted in most difficulty. By way of over-simplifying the types of problems that teachers experienced here, we found that the instructional programs needed more instructions to allow the teacher to deal with the "exceptionally exceptional" student.

For example, a teacher was using a speech and language training program which required as a first step that the student look directly at the teacher and repeat a word that the teacher said. The student did indeed look directly at the teacher upon command but would not repeat the word said by the teacher. However, when another person sat in for the teacher, the student responded appropriately. The instructional program made no provision for such an occurrence and consequently was of little value to this particular teacher. Accordingly, it was found necessary to develop an additional instructional program which taught the skills necessary for transferring the student's response from another person to the teacher. A discussion of the procedure for dealing with this problem was also added to the pre-field test training materials.

Similarly, a teacher was using an instructional program to teach correct walking posture. Part of this program involved the use of a paper plate which was fixed on the wall at about the eye level of the student being trained. During training the student used the paper plate as a "target" to indicate how high he should hold his head. After training was completed and the teacher was satisfied that the student's posture was correct, the paper plate was removed from the wall, whereupon the student immediately began to walk again with the former incorrect posture. This problem was corrected by modifying the instructional program so that the paper plate was gradually reduced in size rather than being abruptly removed, whereupon the student maintained the appropriate walking posture after the plate was removed. A discussion of the importance of gradually removing cues of this type was added to the pre-field test training materials.

A teacher was using a program that was designed to teach eating with a spoon with a blind student. In order to help the student locate the bowl while he was completing the first step of the program (putting the spoon in the bowl), the bowl was tapped with the spoon and the command "eat" was given. Trouble began as the student progressed to the next step (lifting the spoon half-way to his mouth) in that the student simply would not respond following the teacher's instruction "eat." This problem came about because the teacher had paired and reinforced the tapping noise with the instruction "eat" on the first step of the program and consequently the student would not respond appropriately thereafter to the teacher's instruction "eat" unless it was presented simultaneously with the tapping noise. This problem was corrected by having the teacher continue pairing the command "eat" with the tapping noise throughout the use of the instructional program. Obviously, this solution was appropriate only for this particular student. Accordingly, we expanded the pre-field test training materials to include a discussion of this type of phenomenon in order that teachers would be able to correct similar problems should they occur again.

A teacher was using a program designed to teach students to button shirts or blouses. A problem occurred when one of the students refused to put his fingers through the buttonhole and take hold of the button. This problem was solved by putting a piece of candy under the buttonhole, whereupon the student quickly reached through the buttonhole in order to obtain the candy. Once this behavior was firmly established in the student, the size of the piece of candy was gradually diminished until the student would reach through the buttonhole and pull the button through before receiving the piece of candy. This instructional program was modified to include this procedure for those students who would not put their fingers through the buttonhole and a discussion of the technique was added to the pre-field test materials.

Irrelevance to Classroom Situations

By relevant it was meant that the contents of the instructional programs should be directly related to the problems that teachers are frequently confronted with. Since each of the instructional programs provided to the teachers during the field tests focused on student problems as identified by the needs survey previously mentioned, the project staff felt that there would be little problem in this area.

Overall, our perceptions were fairly accurate in this area. The majority of instructional programs mentioned by teachers as being required in addition to those included in the instructional program collection were concerned with activities such as teaching students to engage in playing cooperative games, marching and singing in unison and so forth. Behaviors of this type were generally not sampled in the needs survey. We collected these suggestions for additional instructional programs and are presently incorporating as many as possible of them into the program list to be developed and field tested during the next phase of our project.

Believability

By believable, it was meant that the teachers who would be using the instructional programs would perceive the behaviors in the instructional programs as behaviors that severely handicapped students could in fact be taught. Our project staff dealt with this element through the behavior modification specialist teams, during the pre-field test training by providing the cooperating teachers with extensive research supporting the validity of the instructional programs when used with severely handicapped students. In addition, available media in the form of films and video-tapes showing the implementation of the programs with severely handicapped students.

Two types of concerns surfaced in this area. The first and relatively infrequent concern came about because the instructional programs, having been developed by professionals of the behaviorist persuasion, failed without exception to include any indication of a particular chronological age at which a student should be taught the behavior in the instructional program. That is, the instructional programs did not say that a student should be a certain age before he could learn the behavior taught in the instructional program. Consequently, a program designed to teach blind students the rudiments of using a cane was criticized by a teacher because, according to her professional training, students shouldn't be taught to use a cane until they had reached a certain chronological age.

This type of concern was very difficult to respond to. On the one hand, it seemed pointless to criticize the teacher for the value and/or philosophical position relative to education taken; and on the

other hand, it wasn't likely that behaviorists would be willing to suggest that students were not capable of learning certain behaviors simply because they had not achieved a certain chronological age (Bijou, et al., 1967). We finally reached an unsatisfactory (for us) compromise on this issue by suggesting to the teachers who raised this type of question that they only use the instructional programs with students whom they felt were old enough to learn the behaviors taught in the instructional programs.

A second and far more common concern surfaced as a consequence of the types of behaviors in the instructional programs. In short, while the cooperating teachers willingly accept the premise that a severely handicapped student could readily learn to dress himself or attend to his own hygenic needs, they were much less willing to accept the premise that a severely handicapped student could learn simple addition or a basic sight vocabulary. This concern was dealt with by reviewing again with the teacher the available research supporting the use of the instructional programs and by providing direct support, through the behavior modification specialist teams, to the teacher when one of the instructional programs designed to teach a more complex behavior was used. Consequently, several teachers did begin to achieve some success in teaching more complex behaviors, notably with the sight vocabulary program, and this type of concern was expressed less frequently thereafter.

This did not mean that these teachers had accepted the premise that severely handicapped students could learn these more complex behaviors without considerable difficulty, however. It is fair to characterize their attitude at that point as "I'll believe it when I can do it." This attitude seemed perfectly reasonable to us.

Summary

It has been suggested herein that developers of models to evaluate and field test instructional materials appear to typically overlook one important dimension in their field test models, namely that dimension which is concerned with minimizing the potentially aversive characteristics of the instructional materials and the field test procedures prior to the initiation of the actual field testing. It has been further suggested that ignoring this dimension can adversely affect the accuracy and reliability of the information obtained in the field tests.

This paper has described the development of a procedure designed to minimize the potentially aversive characteristics of the instructional materials to be field tested and the potentially aversive characteristics of the field test procedure itself. It was suggested that such a procedure, were it to prove successful, would

result in an optimization of cooperative teacher behaviors during the field test process and would therefore result in the attainment of more accurate and reliable data from the field tests.

The procedure was developed by "brainstorming" a roster of those elements of the instructional materials and field test procedures which were thought to be potentially aversive to the cooperating field test teachers. After substantial refinement, the project staff reduced the roster of potentially aversive characteristics to six general elements. The implications of the roster of six general elements were such that it was felt the potentially aversive characteristics of the instructional materials and field test procedures could be minimized if it was assured that: the teacher was reinforced for cooperation; that the instructions in the materials were familiar, precise and complete; and that the instructional materials themselves were relevant and believable.

Project staff approached the problem of minimizing these potentially aversive characteristics in a variety of ways. Regarding the first characteristic, ensuring that the teacher would be reinforced for her cooperation during the field tests, the following was arranged: (1) that each cooperating teacher received either college or re-certification credit for participation in the field tests with all tuition costs being paid by the teacher's employing agency; (2) that each cooperating teacher received through a team of behavior modification specialists employed by the teacher's employing agency pre-field test training regarding the skills necessary to use the instructional programs and consultive support as necessary when problems with the instructional programs arose; (3) that each cooperating teacher received a personal copy of all of the instructional programs to be field tested with the costs of these materials being paid for by the teacher's employing agency; and (4) that each cooperating teacher would have the opportunity to suggest new instructional program topics which would be included, as feasible, in the set of new instructional programs to be developed during the coming year.

That this procedure was reasonably successful in eliciting cooperative teacher behaviors can be inferred from the fact that a majority of the eligible teachers agreed to participate in the field testing and further that all of the cooperating teachers successfully completed the task of using a minimum of one instructional program and reporting on its use to the behavior modification specialists.

Project staff approached the task of minimizing the potentially aversive characteristics of the remaining elements in a variety of ways, including using the instructional programs on our own or other readily available children, reading the instructional programs to each other and role playing the instructions in the instructional programs

independently and with each other.

Overall, the data obtained in the field tests thus far indicates that we have been reasonably successful in reducing the potentially aversive characteristics in four of five of the remaining elements. Although, as noted, considerable difficulty was experienced in the element concerned with ensuring that the instructional programs would require no skills on the teacher's part beyond those that had already been taught in the pre-field test training. It was suggested that the majority of problems occurred here when the instructional programs were used with "exceptionally exceptional" students. Whenever possible, the instructional programs were expanded to enable the teacher to use the program with students who were "exceptionally exceptional" and as necessary, this information was incorporated into the pre-field test training materials.

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Level IV. EFFECTS ON LEARNERS

Part B. Methodologies for the Evaluation of Instructional Materials and Media: Assessing Impact on Learners

METHODOLOGIES FOR THE EVALUATION OF INSTRUCTIONAL MATERIALS AND MEDIA: ASSESSING IMPACT ON LEARNERS

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Introduction

There are a host of experimental designs and statistical analysis procedures which have been used in the evaluation of instructional materials. In general, evaluation studies (sometimes called evaluative research studies) using these procedures have been concerned with the problem of assessing the relative impact of particular instructional programs, materials or media on the behavior of pupils and students.

The concerns of experimental design and statistical analysis in evaluation studies regarding impact of instructional materials and media on learners are that the behaviors measured can in fact be atrributed to the instructional program, material or media under examination. Similar to the utilization of design and analysis procedures in research, the problem becomes one of eliminating counter or alternative hypothesis to the program impact hypothesis.

In considering the various uses of procedures to assess the impact of programs or instructional materials and media on learners, an outline of the general procedural stages in such studies is considered. In general, the following procedural elements are present: (1) Sampling: Population Description, Sample Selection and Description; (2) Experimental Design; (3) Measurement; (4) Statistical Analysis; and (5) Data Summarization and Reporting.

To examine the "state of the art" various procedures in each of these areas which have been used to examine the effects of instructional materials and media on learners will be discussed. Certain techniques which have not been used in the past, but which could be used to greater advantage, will be posited.

Sampling

Sample Selection and Description

The purpose of sampling is to provide for economy in collecting and processing data (Jenkins, 1970). If the sample is properly

selected to be representative of the entire population defined, the results can be assumed to approximate what would be found if the entire population had been examined. The best way to accomplish this is through randomized procedures.

Either proportionate or disproportionate samples can be selected depending on the purposes of the evaluation study and the desired focus of conclusions to be drawn. Disproportionate samples are taken when the generalization is to be made relative to the complexion of the community at large. For example, if there were 75% Educable Mentally Retarded (EMR) pupils and 25% Trainable Mentally Retarded (TMR), in the Special Education programs to be represented, the sample would also contain 75% EMR and 25% TMR. Proportionate samples are taken when the concern is for comparing the impact of a particular program on certain subgroups within the community. In these cases, irrespective of the incidence of the subgroup members in the population, an equal number of subjects are selected from the different subgroups (i.e., 50% EMR, 50% TMR).

The complete definition and characterization of populations and the use of random or stratified random sampling procedures in evaluation studies has been rare. One of the reasons for this is the costs involved in taking random samples of classes. Another reason is the complexity of cooperative arrangements which are needed with schools in order to involve pupils in studies. Therefore, the most frequent sampling methodology in evaluative studies has been "selective sampling" (i.e., sample only those classes who will participate).

Under these not so ideal conditions of sampling, a procedure which has been used to deal with the character of non-random samples is sample description. In essence, the sample is defined as a population and the whole population is considered to be sampled.

Survey forms requesting information about the characteristics of the school, community, and the pupils involved in the evaluation study are used. The information from these forms is then compiled to provide a description of the sample.

The sampling problem was approached in a new way by a cooperative group of projects on reading (Bond and Dykstra, 1967). Data were cooperatively collected by 27 different reading projects to provide a more comprehensive view of the effects of a variety of reading programs on different pupil samples.

The variables which were restricted in the studies were: duration of experiment, minimum sample size, nature of the sample, timing of testing, manner of administration of tests, and the nature of the instructions given to the teachers. Individual projects were not

restricted, however, to the agreed upon common measuring instruments of background data, and all data gathered could be analyzed by the project before being turned over to the Coordinating Center. The layout of data processing cards was agreed upon in advance; therefore, each project merely sent duplicate cards to the Coordinating Center when the studies were completed.

Although the sampling was not random, it was certainly more diversified and, thus, representative of a larger population of pupils than would have been collected by the individual projects. This cooperative technique holds tremendous potential for wider use in other evaluation studies on instructional materials and media.

Experimental Design

There are certain inherent properties in classes of design which either increase or decrease the probability of alternative hypotheses being eliminated when these classes of design are used. Since a comprehensive coverage of experimental designs, their strengths and weaknesses in eliminating rival hypotheses is provided elsewhere, a detailed discussion will not be provided here as well (see Campbell and Stanley, 1963).

Measurement

There have been two major approaches used to assess learner behavior. One approach uses norm-referenced, standardized tests. The other approach uses criterion referenced mastery tests. A good discussion of the differences, strengths and weaknesses of the two different approaches has been provided elsewhere (see Bond, 1972).

Of considered importance in the measurement area is whether or not one should assess the more general understandings which are tapped by standardized norm-referenced tests or whether to assess the more discrete bits of information and/or behavior which can be directly tied to the instructional program under test, or both (Cronbach, 1963). Direct assessment of the behaviorally identified objectives of the program by a content-specific test is viewed by some as a minimum standard of performance to be met by the program under test. When the goals of the general school curriculum are considered, however, a more content valid test such as the more global norm-referenced achievement tests. It would appear that both should be used since they provide different types of information about the effectiveness of instructional materials and media in effecting different classes of behavior in the learner.

The decision in part must be made relative to the purposes of the program evaluation. If one only wants to know how well the instructional material or media is achieving its objectives, then the test should be made to fit the objectives. If one wants to know

how well the instructional material or media is serving the national interest, then an assessment of all outcomes might be worth striving for (Cronbach, 1963). Ideal evaluation will collect evidence on all abilities towards which the material under test might reasonably aim.

Sampling Frequency

Another concern within the measurement area is the frequency with which one samples the behavior. The frequency of the behavioral sample may range from minutes to years.

Continuous Sampling. Assessment of pupil behavior by teachers on a continuous basis can provide unique information and other favorable qualities not offered by only taking general measures with less frequency. For example, continuous assessment by the teacher provides ongoing feedback immediately after specific instructional acts which can provide information for making necessary instructional adjustments (i.e., formative evaluation). This type of assessment focuses on the behavior as it occurs, it provides a longitudinal record of the pupil's progress and provides a check on the use or the application of skills and information learned within the specific conditions of a given lesson (Brown, 1969). The following guidelines have been provided for the collection of continuous pupil performance data by teachers in the classroom: (1) Employ the techniques frequently (set up a consistent sampling plan and sample frequently), (2) Sample under a variety of conditions (it is important to determine whether the child performs under different conditions), (3) Retain student work samples for use in establishing baselines and comparing the pupil with himself, and (4) Record performance in a form which is easily referenced for assisting the pupil in education (Brown, 1969).

The informal and continuous assessment of pupil performance involves three different general approaches: (1) observation, (2) collecting of pupil work samples and (3) situational opportunities for assessing the application of skills and information.

More formal and systematic continuous samples can be drawn by establishing time frames (e.g., five minutes) and randomly selecting specific frames during which behavioral sampling will occur. These procedures are most frequently used when particular classes of overt behaviors have been identified and are to be counted to obtain frequencies.

Time samples (assessments over time) can be more formal and more widely spaced. For example, the administration of a particular overall assessment procedure every month for several years with a corresponding track of the instructional programs in effect would provide yet another type of evaluative data.

Conceptualizing Effect

Another problem of concern in the measurement area of evaluative studies is the conceptualization of effect. One of the most frequently used conceptualizations of effect is behavior change. Typically, behavior change is translated as scores obtained by looking at the difference between pre (before program) and post (after program) assessments. Another conceptualization of effect views exhibited behavior at any particular point in time as the most likely behavior (i.e., that which is most real or expressive of the phenomena). If the behavior exists at one point in time, then it is not critical that it did or did not exist at another point in time. This issue, although directly relevant to the measurement area, also affects the types of statistical procedures used as well.

Problems in Measuring Change

When effect is conceptualized as a change score, several analytic problems arise. One of the persistent problems which accompanies attempts to properly estimate change is the systematic error related to change scores. "Raw change" or "raw gain" scores formed by subtracting pretest scores from posttest scores lead to fallacious conclusions, primarily because such scores are systematically related to any random error of measurement (Cronbach and Furby, 1970). In lieu of change scores, estimates of "true change" derived from the utilization of regression procedures have been proposed (Cronbach and Furby, 1970). This procedure is advantageous in that it allows for use of multivariate assessment designs.

Multivariate Assessment

In many cases the impact of a program or material on the learner is non unidimensional, and to combine many different types of post-course performance into a single score is a mistake. When this is done, failure to achieve one objective is masked by success on another. Moreover, since a composite score embodies and usually conceals judgments about the importance of the various outcomes, only a report that treats the outcomes separately can be useful to educators who have different value hierarchies (Cronbach, 1963).

One of the greatest services evaluation can perform is to identify aspects of the course where revision is desirable. Insofar as possible, evaluation should be used to understand how the course produces its effects and what parameters influence its effectiveness (Cronbach, 1963). All of the outcomes that the material or program produces should be assessed. Without this total base of information, comprehensive evaluative statements cannot be made. Assessing multiple outcomes requires multivariate assessment.

Statistical Analysis

Statistical analysis procedures which have been used most frequently in evaluation studies have been Student's t, analysis of variance and analysis of covariance. Some of the newer more classical procedures which are just now coming into use are simple regression, multiple regression, canonical correlation, and some of the factor analytic techniques. Two procedures which have not been widely used but which hold great promise for use are sequential analysis (see Nelson and Grenda, Level IV, Part D) and time series analysis (Glass, Willson and Gottman, 1972).

Data Summarization and Reporting

One of the more difficult aspects of the conduct of an evaluation study is the summarization of the results and the reporting of these results to the consumer. Unfortunately, for the consumer, the results of many evaluation studies go unreported or if reported they are non-consumable.

Business and government lobbies have for many years noted the value of graphs and charts in providing visual displays of more complicated statistically derived results for non-technical audiences. This is a procedure for summarizing and reporting evaluation data to consumers that has not been capitalized on by evaluators.

Summary

The "state of the art" in the utilization of research methodologies for the purpose of assessing the effects of programs or materials on learners has been examined. The major procedural areas which were inspected were: (1) sample selection, (2) experimental design, (3) measurement, (4) statistical analysis, and (5) data summarization and reporting.

To examine these procedures in more detail as they would be used in an evaluative study, a comprehensive report on the evaluation of the effects on learners of particular programs is provided (see Appendix A). Two general models for the evaluation of instructional programs are reported. One model used the "one-group pretest-posttest design" (Campbell and Stanley, 1963) and the other model used a two-group pretest-posttest design where one group was involved in the experimental instructional program (the program under test), and the other group was involved in another instructional program.

Intact (i.e., not randomly assigned) classrooms were studied. The statistical analysis procedures utilized to analyze the data were Student's t and analysis of covariance. Group comparability in the two-group model was determined by surveying participating schools

using a specified survey instrument and then descriptively comparing the groups. Learner assessment was done using standardized norm-referenced tests. In the one group situation baseline data was collected to determine the expected pattern of growth in achievement over time. The actual achievement of the group in the experimental program was compared with the expected level of achievement established through baseline data both graphically and statistically using Student's t statistics (see Appendix A). Reports on these studies are provided for illustration. The reports of what was done are comprehensive and complete.

It is hoped that similar reports illustrating the variety of methodologies called for in the design of evaluative studies will be provided in the future.

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Bond, G. L., & Dykstra, R. The cooperative research program in first-grade reading instruction. Reading Research Quarterly, 1967, 2(4).

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Cronbach, L. J. Course improvement through evaluation. Teachers College Record, 1963, 64.

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APPENDIX A

Two Research Models

TWO RESEARCH MODELS
FOR THE DISTAR™ INSTRUCTIONAL SYSTEM[1]

By the

STATISTICAL ANALYSIS AND EDUCATIONAL TECHNOLOGY DEPARTMENT
SCIENCE RESEARCH ASSOCIATES, INC. CHICAGO, ILLINOIS 60611

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What's in Here?

The Overview gives a brief statement about the two research models for studying the DISTAR™ programs. It is intended to help you decide which research model is most appropriate for your studies.

Section A--General Considerations--goes into somewhat more detail about both models, suggests ways of obtaining the necessary data, and briefly outlines some points that might be considered in your summary report.

Section B--the One-Group Model--gives the rationale behind the design, shows (step by step) how to analyze your data, how to determine the significance of your results, and presents an example.

Section C--the Two-Group Model--deals with how analysis of variance can be used to compare the performance of two similar groups of students. It gives step by step instructions for analysis of the data and determining the significance of the results, and it gives an example.

The Reference Tables section provides data useful in applying the models to your data.

* * * * *

The final form of this report was prepared by Nancy Reise, using an IBM APL/360 program and computer terminal to edit the rough copy and compose the final version. We also owe thanks to Nam Raju, Statistical Consultant, and to all the other people who helped by reviewing the rough copy.

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OVERVIEW

by Vernon S. Larsen

INTRODUCTION

Here are two models for investigating the effect of the DISTAR™ Instructional System on students' achievement test performance. There is a two-group model for comparing the effects of the DISTAR programs with other programs, and there is a one-group model that can be used when all the students are in the DISTAR programs. Both models are presented simply (almost in "cookbook" form), but they are psychometrically sound.

You can use them with the following combinations of programs:

* DISTAR Reading, Language, and Arithmetic
* DISTAR Reading and Language
* DISTAR Reading and Arithmetic
* DISTAR Reading
* DISTAR Arithmetic

The two-group model uses analysis of covariance to compare two instructional programs where the students using each program are similar. The one-group model is for situations where all students take the same program, and for those where no similar group of students can be used as a control group. In this model a t test is used to compare actual achievement with expected achievement. Both models allow for repeating the research study to gain more data year after year.

The models should help you see the effect of two and three years exposure to the programs. Students would begin level I of the DISTAR programs at the beginning of first grade. They would continue into levels II and III in second and third grades. (Because of the sequencing of objectives in the DISTAR programs and the nature and purpose of the tests used, we do not recommend using end-of-grade-one test results for decision making.)

You may wish to make a fuller study of the effects of the DISTAR programs than is discussed. You may also find that these models open up additional possibilities for comparisons. You may want to supplement these models with additional comparisons; consideration of the number of DISTAR program lessons reached by various groups of students; formal or informal observations by teachers and supervisors; comments by students, parents, and classroom observers; and other indicators of students' attitudes and interests.

In addition, you may want to study the results obtained from specific criterion-referenced measures, such as the Mastery Tests available for the DISTAR Reading I and Reading II programs.

This overview will help you decide which model to use. The overview is followed by considerations that apply to research studies using either model. After that section you will find a set of instructions and worksheets showing how to use each model.

The models shown here can be used in other grades and for any instructional program for which adequate tests are available.

WHICH MODEL?

THE TWO-GROUP MODEL IS RECOMMENDED:

* If the students using the DISTAR programs are similar to the students using the other programs,

AND

* If the two groups of students are similar in size,

AND

* If the students remain in the same instructional programs for the duration of the study,

AND

* If both groups of students are tested at the same times with the same tests.

THE ONE-GROUP MODEL IS RECOMMENDED:

* If all students in the schools in the study must use the same instructional programs,

OR

* If students are pre-selected for the DISTAR programs,

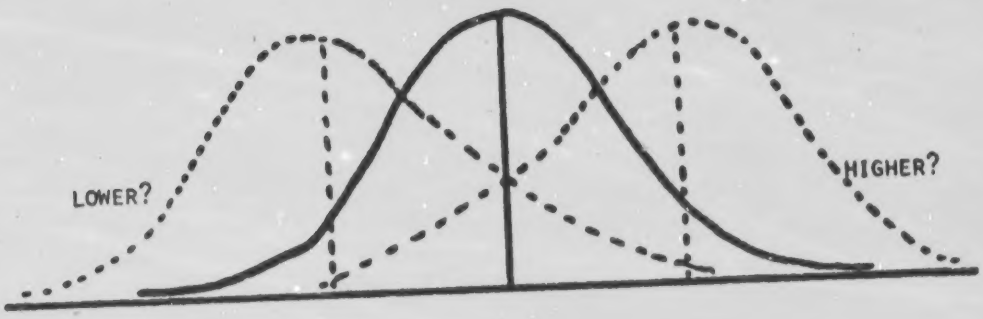
OR

* If students using the DISTAR programs and students using other programs are not similar in terms of such factors as their socio-economic background, their linguistic background, their previous school or pre-school experience, and the nature of the school they attend (pupil/teacher ratio, number and use of paraprofessionals, teacher experience, etc.).

A TWO-GROUP MODEL

Question: Is the average performance of students in the DISTAR Instructional System significantly different on standardized achievement tests from that of comparable students using another instructional program?

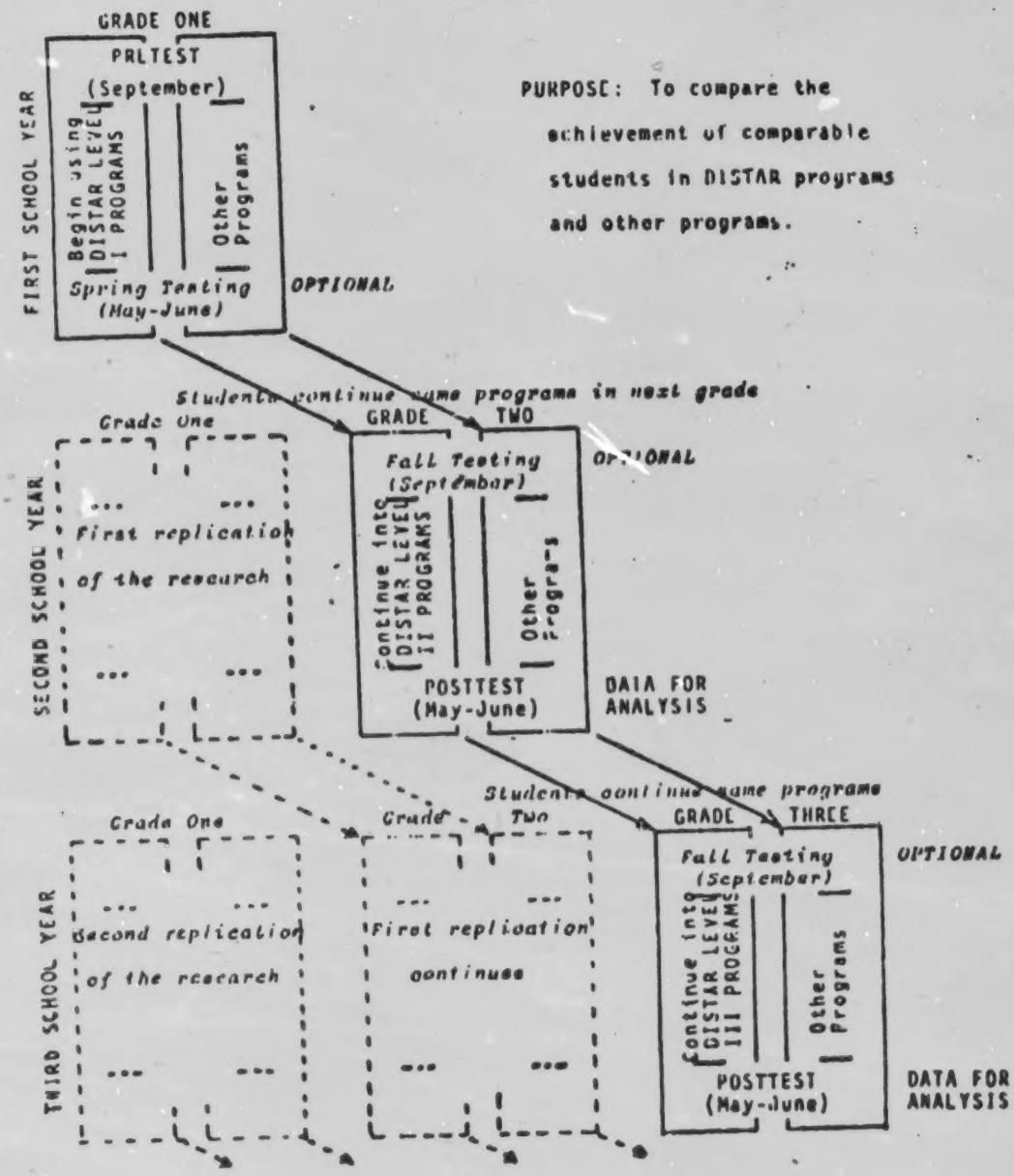
Method: Compare achievement test performance of both groups, using analysis of covariance to adjust for possible slight initial differences between the groups and determine the significance of the posttest difference.



Pretest: Basis for making the two groups statistically comparable.

Posttest: Measure on which the achievement of the two groups is compared.

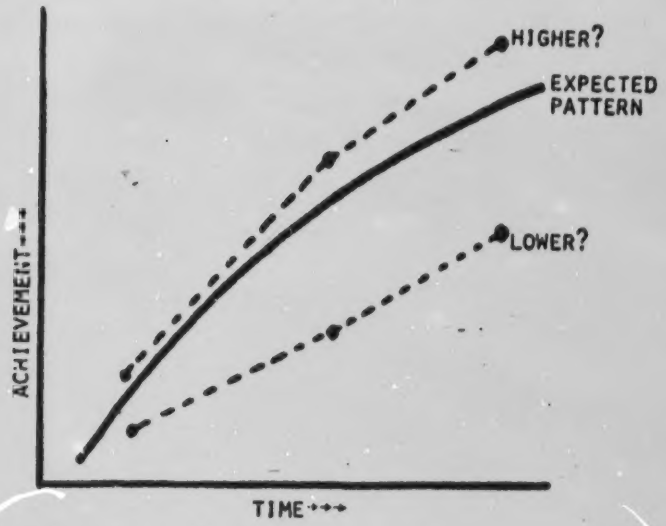
TESTING AND INSTRUCTION PLAN--TWO-GROUP MODEL



A ONE-GROUP MODEL

Question: Is the average performance of students in the DISTAR Instructional System significantly different from that normally expected of similar students in the nation as a whole on standardized achievement tests?

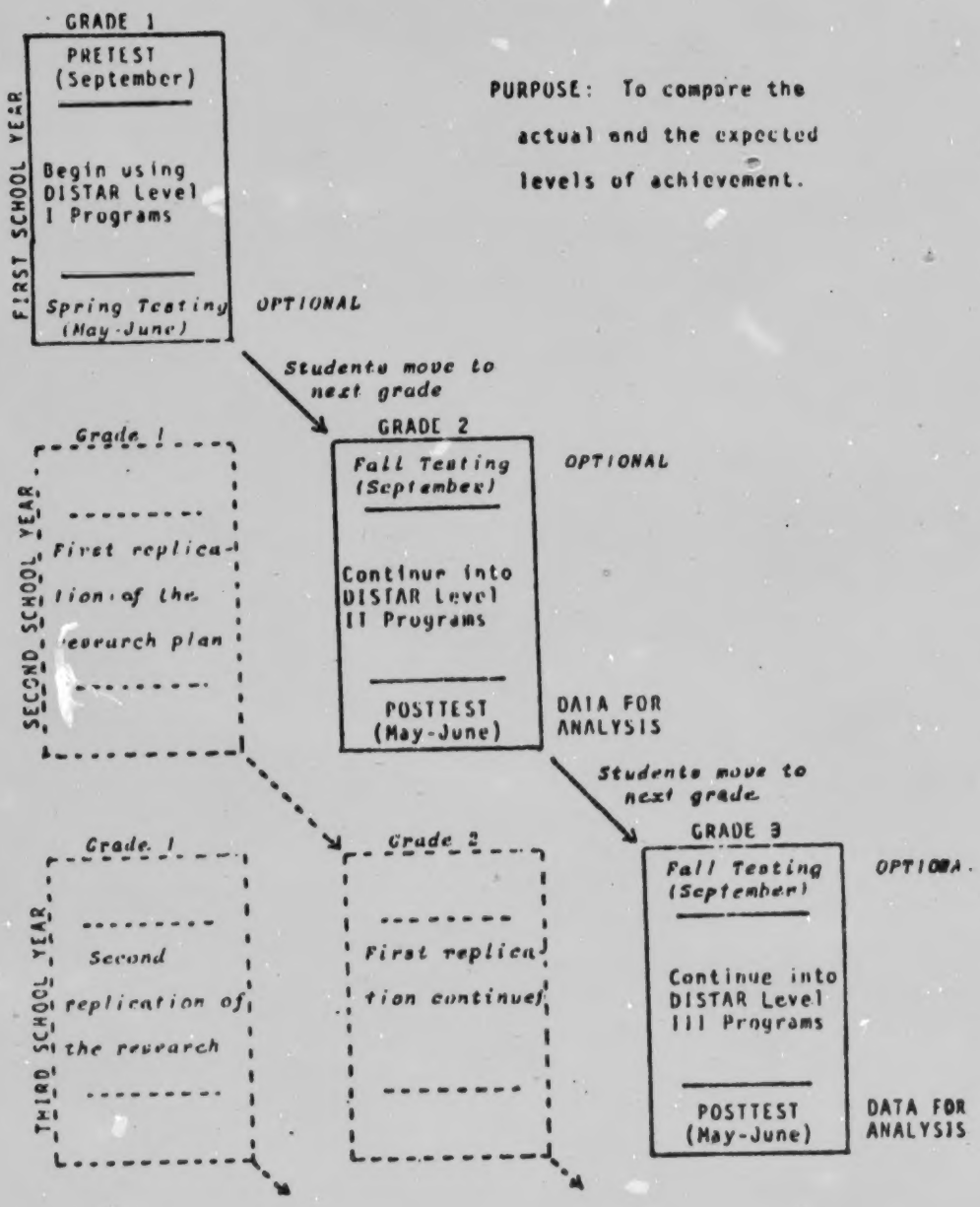
Method: Determine normally expected pattern of growth and compare actual performance with expected level of achievement, using a t test to find the significance of the difference.



Pretest: Baseline for establishing normally expected pattern of growth in achievement.

Posttest: Measure on which actual achievement is compared with expected level of achievement.

TESTING AND INSTRUCTION PLAN--ONE-GROUP MODEL



REFERENCES

The research models presented here use standard statistical procedures dealt with in a number of easily obtainable references. The ones we have consulted most frequently in developing the designs and the instructions are--

For the two-group model using analysis of covariance:

Winer, B.J. Statistical Principles in Experimental Design. New York: McGraw-Hill, 1971.

McNemar, Q. Psychological Statistics. New York: John Wiley and Sons, 1969.

For the one-group model using t-tests:

Walker, H.M. and J. Lev. Statistical Inference. New York: Holt, Rinehart and Winston, 1953.

A. GENERAL CONSIDERATIONS

--by Rita M. Karwacki

INTRODUCTION

Before choosing between the two research models discussed here, you should acquaint yourself with the requirements that must be satisfied if the model is to be used correctly. Using information gathered from questionnaires, such as the school/community questionnaire and the teacher questionnaires presented here, and taking into account your general knowledge of the student population, plus special administrative and practical considerations, you should be able to determine which model will better suit your own situation. This will also help you determine what you need to do to use the model appropriately.

The models proposed need not interfere with normal school instruction or with needed student testing and evaluation. A research study should be looked at as something beyond the normal information needed to operate a school or a school system.

Regardless of which model you choose, it is extremely important that the students remain in the same instructional program for the duration of the study.

Once you have chosen a model, you must allow sufficient time for your instructional programs to have their intended effect before making evaluative judgments. You should not try to make decisions based on the results of using the programs after only one year of instruction. At least two years of exposure to the programs should be allowed for any meaningful evaluation. Premature evaluation may be misleading.

The following sections will give you the specific requirements needed to use each of the proposed models. If you are not sure whether you can meet the requirements of the two-group model, you should use the one-group model.

THE TWO-GROUP MODEL

The purpose of the two-group model is:

> To determine whether there is a difference between the performance of students using the DISTAR programs and the performance of students using another instructional program, and to determine if this difference is statistically significant.

In the educational community, when two instructional programs are to be compared, few matched control groups exist or are practical. Therefore, any comparisons you make will probably have to be made between groups of students that are similar but not perfectly comparable. If you make tests of the significance of differences between two groups that are not comparable, you cannot attribute the difference in performance to any specific condition. It is only when the two groups are comparable that any differences in performance can be attributed to the differences in the instructional programs used, all other things being equal.

Because of the model requirements and the administrative and practical considerations involved, the use of the two-group model should be limited to:

* situations where the student population is large enough that you can limit your study to groups who are similar in composition and size, or to
* situations where you can exercise control over the assignment of programs to be used in classrooms where the conditions and students are similar.

If you use the two-group model, the testing requirements are:

* appropriate tests administered prior to and after exposure to the programs used;
* the same testing instruments used for both groups;
* testing instruments administered at the same time for both groups; and
* testing instruments which are consistent for the duration of the study.

THE ONE-GROUP MODEL

The purpose of the one-group model is:

> To determine whether the actual mean achievement of DISTAR students was greater than or less than that normally expected of students at the same initial level, and to determine whether this difference is statistically significant.

Much research on the effectiveness of specific instructional programs has been based on comparisons of the performance of students using that program to the performance of students using another program. For this type of research, of course, the comparability of the students in the different programs must be determined.

It is, however, often impossible to establish comparability between students in schools impacted by the DISTAR programs and those in schools not using the programs. Sometimes this is because of the way the schools or students are selected for the DISTAR programs. In other instances, there may be funding requirements or community considerations that make it necessary to provide the same curriculum to all of the students.

To assume comparability, the groups must be similar in composition and size. Often these requirements cannot be met. For example, if the students in the DISTAR group are chosen from the entire student population because they were identified as having potential learning problems, and if they comprise only 15 percent of the student population, it would not be meaningful to compare the performance of the DISTAR group with that of the rest of the students. In this situation it would be more meaningful to make separate comparisons: comparing each group's performance to the expected performance of that group, using the one-group model in each case.

The one-group model does not require the use of a control group. Instead it takes advantage of a procedure that uses the extensive data obtained during the recent standardization of the SRA Assessment Survey and--in effect--uses appropriate student performance throughout the nation as the control against which the performance of the students in the DISTAR programs is compared. This procedure is also appropriate for tests other than the SRA Assessment Survey, so long as they are nationally standardized.

If you use the one-group model, the only requirement for the testing is that the instruments used be nationally standardized tests appropriate for the subject.

POPULATION DESCRIPTION

In order to describe the nature of the student population involved in the study, an administrator or delegate in each school in the study should complete a questionnaire describing the population of the school and the community. As can be seen from the sample questionnaire that follows, the nature of the questions is deliberately intended to avoid any problem of invasion of privacy of the students or their parents or guardians.

You can use the results of the questionnaire in your summary report to describe the population under study. The results can help you make generalizations from the specific group of students studied. You can also use the questionnaire results to help determine if the population is similar to others being considered for replication of the study.

If the student population is large and you do not wish to include all the students in the study, the results of the questionnaire could be used to combine schools into categories based on similar populations. Then certain schools who have similar populations could be selected for inclusion in the study. Selected schools using DISTAR could be used as the DISTAR group. Similar schools not using DISTAR could be used as the non-DISTAR group if you use the two-group model.

SCHOOL QUESTIONNAIRE

SRA RESEARCH PROGRAM

COMMUNITY DESCRIPTION

1. Which of the following categories best describes the community in which your school is located?
(Check one)

Rural farm..... (
Rural non-farm..... (
Industrial suburb..... (
Residential suburb..... (
Urban inner-city..... (
Urban residential..... (

2. What is your estimate of the dwelling area served by your school?
(Check one)

Very high: most exclusive area, the Gold Coast, best suburbs, etc..... (
High: the better suburbs and apartment house areas, houses with spacious yards, etc..... (
Above average: areas all residential, larger than average space around houses, apartment areas in good condition..... (
Average: residential neighborhoods, no deterioration in the area..... (
Below average: area not quite holding its own, beginning to deteriorate, business entering, etc..... (
Low: considerably deteriorated, rundown and semi-slum..... (
Very low: slum..... (

3. Which of the following categories best describes the occupations of the majority of heads of families in your school area?

Professional and executive..... (
Businessmen, proprietors and farm owners (accountants, supervisors, insurance brokers, etc.)..... (
Skilled, semi-skilled and service workers (electricians, sales clerks, firemen, etc.)..... (
Unskilled laborers, farm workers, etc..... (
Welfare recipients, migrant workers, unemployed..... (

4. What is your estimate of the median educational level of the heads of the families in your school area?
(Check one)

College graduate..... (
Vocational training beyond high school..... (
Completed high school..... (
Did not complete high school..... (
Grade 8 or less..... (

SCHOOL DESCRIPTION

5. Please describe, in percentages, your school's student population.

American Indian..... _____%

Black..... _____%

Oriental..... _____%

Spanish Surname..... _____%

White..... _____%

Other..... _____%

Total 100

6. Compared with students in other schools in your community, would you say that the learning ability of the students in your school is:

_____excellent _____above average _____average _____below average _____poor

7. Compared with other schools in your community, would your say that the facilities in your school are:

_____excellent _____above average _____average _____below average _____poor

8. Compared with other schools in your community, would you say that the training of the teachers in your school is:

_____excellent _____above average _____average _____below average _____poor

9. What is the number of school days in your 1970-1971 school year? _____

COMMENTS _____

_____

_____

_____

_____

Name of person filling out form _____

Title _____ Date _____

School Name _____ City _____ State _____

INSTRUCTIONAL PROGRAM USE

In these models the first grade students should start in DISTAR Level I during Year 1 (first school year) of the study and continue into DISTAR Level II during Year 2 of the study and into DISTAR Level III in Year 3 of the study. In the second school year, the research plan can be replicated by starting the new first grade students in DISTAR Level I and continuing them into DISTAR Level II during Year 3 of the study. In the third school year, the research plan can again be replicated by starting the new first grade students in DISTAR Level I.

It is important to remember that the philosophy of the DISTAR Instructional System is to enable the student to master the material as fast as possible (but not to proceed faster than the material is mastered). This means that it is entirely possible that some students could begin using DISTAR Level II during their first year of instruction, while others might have to complete DISTAR Level I during their second year of instruction. The same would apply to the starting point of DISTAR Level III.

The same instructional plan applies to students in the non-DISTAR group, if you are using the two-group model. Students starting in first grade in the other instructional programs will continue with the same programs throughout the course of the study.

Using this research plan, whether or not control groups are used, you will be able to describe and evaluate the performance with two and three years of exposure to the DISTAR (or other) instructional programs.

In order to describe the nature of the classroom situations in which the instructional programs are used, you should obtain information on the teacher's background, classroom assignment, program scheduling, etc., from each teacher involved in the study. Samples of teacher questionnaires for teachers using DISTAR or other instructional programs are shown below.

Information like this can be used in a summary report describing the instructional programs used with the students in the study.

If the student population is too large to include all of the students in the study, you could use the teacher questionnaire in conjunction with the school/community questionnaire to choose similar classrooms or schools.

TEACHER QUESTIONNAIRE--DISTAR™

SRA RESEARCH PROGRAM

TEACHER BACKGROUND

1. Approximately how long have you taught:
   In the primary grades_____
   Any of the DISTAR Programs_____

2. What special training have you received for work with the DISTAR programs?

   _____

3. Are you closely supervised? Yes ( ) No ( ) If yes, by whom?_____

   _____(Title)_ _____

CLASS ASSIGNMENT AND SCHEDULING

1. What criteria were used for selection of students for this class?_____

   _____

2. How many students (per program) are in each of the groups that your class is divided into?

Reading	Arithmetic	Language
_____(top)	_____(top)	_____(top)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. How many days per week are the DISTAR programs taught?

   Reading_____ Arithmetic_____ Language_____

4. What is the typical length of the session?

   Reading_____ Arithmetic_____ Language_____

5. Do you use teacher, paraprofessional, or volunteer aides? No ( ) Yes ( )
   If "yes"; how many aides are used? _____
   do they teach DISTAR? No ( ) Yes ( )
   If "yes", which programs? _____

Teacher Name_____ Grade_____ Date_____

School Name_____ City_____ State_____

TEACHER QUESTIONNAIRE--GENERAL

S R A R E S E A R C H P R O G R A M

TEACHER BACKGROUND

1. Approximately how long have you taught:
   In the primary grades_____
   Your current basal programs_____

2. What special training have you received for work with your basal programs?

   _____

3. Are you closely supervised? Yes ( ) No ( ) If yes, by whom?_____

   _____(Title)_____

CLASS ASSIGNMENT AND SCHEDULING

1. What criteria were used for selection of students for this class?_____

   _____

2. Do you divide your class into groups for instruction? No ( ) Yes ( )
   If yes, how many students (per instruction program) are in each of the group?

Reading	Arithmetic	Language
_____(top)	_____(top)	_____(top)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. How many days per week are basal programs taught?

   Reading_____ Arithmetic_____ Language_____

4. What is the typical length of the session?

   Reading_____ Arithmetic_____ Language_____

5. Do you use teacher, paraprofessional, or volunteer aides? No ( ) Yes ( )
   If "yes", how many aides are used?_____
   do they teach the basal instructional programs? No ( ) Yes ( )
   If "yes", which programs?_____

Teacher Name_____ Grade_____ Date_____

School Name_____ City_____ State_____

TESTING PROGRAM

To monitor the performance of the students through the course of their study, you should establish your testing schedule to make maximum use of the data from the minimum possible amount of testing. The testing schedule should be the same whether or not control groups are used.

As illustrated in the Testing and Instruction Plans for both models, the testing involves obtaining pretest data by administering tests prior to beginning the instructional programs. The purpose of obtaining this data is to establish a baseline from which expectations or comparisons can be made. Subsequent testing consists of administering posttests at the end of each school year. Testing at the end of the first year of instruction is optional; the results of this testing should not be used (in either model) for making final decisions about the effects of the programs. The purpose of testing at the end of the second and third year of the study is to measure performance after differing amounts of exposure to the instructional programs.

Additional optional testing might consist of pretests at the beginning of each year of the study. Fall testing would help you monitor changes in the student population, if you feel that the nature of the school's population is changing. The results of the optional testing should mainly be used for purposes other than the research and evaluation study--such as diagnosing students' general strengths and weaknesses in the areas tested.

STANDARDIZED TESTS

Some educators object to the use of standardized tests in research studies designed to determine which instructional materials are most effective. The practical view of the content presented in standardized tests is to take it for what it is: groups of tasks carefully formulated and skillfully selected to represent a fair and accurate sampling of important topics taught in the schools today. In essence, standardized tests measure general concepts and skills--representing accepted goals or end products or instruction (not necessarily the specific instructional steps or tasks an individual program uses to lead toward the goals).

Some teachers take the position that if tests are to be used for the purpose of evaluating educational programs, they must conform very closely to the content of the local curriculum. The contrasting position views the function of testing more broadly. It holds that a testing program, to the greatest degree possible, should concern the more generalized, more distant objectives common to the large population of students. Beyond the immediate outcomes of instruction are goals that can be reached by many different approaches and through a variety of specific content. One of the proper and legitimate functions of standardized tests is to assess progress toward these goals.

Here are some of the advantages of administering standardized tests in research studies using the models presented in this paper.

1. STANDARDIZED TESTS MEASURE WIDELY ACCEPTED OUTCOMES OF EDUCATION

   The major contemporary standardized tests are devised by knowledgeable content experts, based on a comprehensive survey of current instructional programs, supplementary materials, state and local curricula, and research literature on the topics involved. The exercises are reviewed by teachers and curriculum experts.

2. STANDARDIZED TESTS ARE NOT LIKELY TO FAVOR THE CONTENT AND OBJECTIVES OF ONE PROGRAM OVER ANOTHER

   Because standardized tests measure general concepts and skills representing accepted goals or end-products of instruction, the content includes questions representative of the most common instructional goals, but not specific objectives of specific instructional programs.

3. STANDARDIZED TESTS ARE PRETESTED FOR THE USER.

After the test content has been reviewed by experts, the exercises are field tested on representative samples of students for whom the material is intended. The resulting data from the field testing are carefully examined to eliminate inappropriate questions or exercises (questions that are too easy or too difficult and exercises that exhibit ambiguity or that tend to confuse).

4. STANDARDIZED TESTS HAVE COMPARISON VALUES THAT ARE AVAILABLE IN NO OTHER TYPE OF TEST.

Standardized tests have a distinct value in that scores obtained by one group of students can be compared with the performance of a larger (and perhaps more representative) population of students. This results from the very process of "standardizing" wherein a test is administered to a large number of students with diversely varying backgrounds--a population that few teachers and administrators have had the opportunity to observe firsthand.

The norms, a sometimes criticized aspect of standardized tests, provide descriptive information with unique advantages in the evaluation of achievement. A local school population can be viewed against a background of a broad and representative national student population that few teachers have a chance to become directly acquainted with. For some tests, norms are also available for a variety of sub-populations. The SRA Assessment Survey, for instance, can provide you national norms or with Large City, Title I, Rural/Small Town, Non-Public, and High SES norms.

5. STANDARDIZED TESTS ARE EASY TO ADMINISTER, TO TAKE, AND TO SCORE ACCURATELY.

Group administered standardized tests have the advantage over other types of tests not only in ease of administration and scoring, but because of the variety of data available in score reports. For many standardized tests, centralized scoring facilities can take the entire burden of test scoring off the shoulders of the classroom teacher.

CHOOSING THE TESTS

In choosing the test to use, the following considerations should be taken into account:

* the tests should provide normative reference for comparison;

* the normative data should describe the performance of other students who have taken the same test at about the same point in the educational continuum; and

* the norm population or reference group should be defined appropriately and meaningfully, depending on the kinds of comparisons that need to be made. It should make sense to compare your students' performance with the performance of the reference group.

Tests, no matter what kind or how the scores are reported, do not provide all the answers. There is no infallible set of rules to guide us to the conclusion of cold, hard facts about the children. But since they involve systematic standardized procedures, the tests can help us to make reasonable and useful judgments and can help us estimate how accurate our judgments might be.

The following list of tests is provided for your consideration in choosing appropriate instruments to implement your research and evaluation model proposed. This is not a complete list of all appropriate tests that could be administered, but a sampling of tests that meet the essential requirements of the models presented here.

SOME STANDARDIZED TESTS TO CONSIDER

Grade 1 PRETEST

Metropolitan Achievement Tests, Primer
Stanford Early School Achievement Test, Level I
Tests of Basic Experiences, Level I

Analysis of Learning Potential, Primary I
California Test of Mental Maturity, Level 0
Cognitive Abilities Test, Primary I
Otis-Lennon Mental Ability Test, Primary I
SRA Primary Abilities Tests, K-1
SRA Short Test of Educational Ability, Level I

Clymer-Barrett Prereading Battery
Gates-McGinitie Reading Tests: Readiness Skills
Lee-Clark Reading Readiness Test
Metropolitan Readiness Tests

Spring (Optional)

California Achievement Tests, Level I
Cooperative Primary Tests, Forms 12 A/B
Metropolitan Achievement Tests, Primary I
SRA Assessment Survey, Primary I, Forms E/F
Stanford Achievement Test, Primary I

Grade 2 Fall (Optional)

California Achievement Tests, Level I
Cooperative Primary Tests, Forms 12 A/B
Metropolitan Achievement Tests, Primary I
SRA Assessment Survey, Primary I, Forms E/F
Stanford Achievement Test, Primary I

POSTTEST

California Achievement Tests, Level II
Cooperative Primary Tests, Forms 23 A/B
Metropolitan Achievement Tests, Primary II
SRA Assessment Survey, Primary I, Forms E/F
Stanford Achievement Test, Primary II

Grade 3 Fall (Optional)

California Achievement Tests, Level II
Cooperative Primary Tests, Forms 23 A/B
Metropolitan Achievement Tests, Primary II
SRA Assessment Survey, Primary II, Forms E/F
Stanford Achievement Test, Primary II

POSTTEST

California Achievement Tests, Level II
Cooperative Primary Tests, Forms 23 A/B
Metropolitan Achievement Tests, Elementary
SRA Assessment Survey, Primary II, Forms E/F
Stanford Achievement Test, Primary II

PREPARING A SUMMARY REPORT

The following outline shows major headings commonly used in writing research reports. These sections are: Introduction, Sample, Design, Analysis, Results, Discussion, and Recommendations. We have indicated possible sources of the needed information, and in some cases we have given examples of the kinds of things you may want to include in your report.

INTRODUCTION

Purpose of Study

Source: Pages A-3 or A-4 in "General Considerations."

Description of Site

Source: School and Community Questionnaire, pages A-6 and A-7.

Example: "The schools used in this study were located in an economically depressed rural area designated as a target for ESEA Title I funds. The facilities of the schools were considered to be below average for the area."

Professional Staff

Source: Teacher Questionnaire, pages A-9 and A-10, and School Questionnaire, page A-7.

Example: "The average teaching experience of the teachers involved in the study was five years. They had had an average of three years of experience teaching the DISTAR programs. All of the teachers involved in the study had one week of pre-service training and in-service training from a consultant once a week. The training of the teachers was considered by the school principals as above average."

Description of Instructional Program Use

Source: Teacher Questionnaire, pages A-9 and A-10.

Example: "The DISTAR Reading, Language, and Arithmetic programs were used in all first grade and second grade classrooms in the schools included in the study. The children were taught in small instructional groups for approximately 30 minutes a day, five days a week, in each subject area. The teachers held strictly to the published teacher guides. One aide was used with each group of students. The aide assisted in instruction but was not directly responsible for the teaching of any of the areas."

SAMPLE

Source: School and Community Questionnaire, page A-7.

Example: "In total there were ... students in the study. The total sample consisted of 50 percent black students, 35 percent students with Spanish surnames, and 15 percent white students."

DESIGN

Description of Design

Source: Page O-5 or O-7 in "Overview."

Testing Schedule

Source: Page A-11 in "General Considerations," and page O-6 or O-8 in "Overview."

Description of Instruments Used

Source: Manuals for the tests used.

ANALYSIS

Source: "The One-Group Model" or "The Two-Group Model" (Section B or C following).

RESULTS

Summary Tables

Source: Page B-7 or C-15.

Example: "The results of the analysis of the performance of students using the DISTAR programs are presented in Table ...."

Description

Example: "The performance of the students using the DISTAR programs was higher than normally expected from similar students. The difference was significant at the 95 percent level of confidence."

DISCUSSION

Example: "The results of this study strongly suggest that the DISTAR Instructional System was more effective in teaching reading and mathematics to students of this level than the typical program."

RECOMMENDATIONS

Example: "The results of this two-year study suggest that the DISTAR program should be implemented in the rest of the schools in the district."

B. THE ONE-GROUP MODEL

--by Vernon S. Larsen

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RATIONALE

The one-group model is predicated on the observation that under normal circumstances a group's average score tends to remain the same from year to year in relation to a national norm or reference group. If a group's average is at the 35th percentile at the beginning of grade one (on beginning-of-first-grade norms), we would normally expect the average to be at the 35th percentile again in grade two and in grade three. If the group's average in a later grade is higher than expected, then their performance is "better" than normally expected: the school (or district) may be doing a better job than the typical school in the nation does for students of that level. Similarly, if the students' average is not as high as expected, the school (or district) may not be doing as much for the students as the typical school in the nation does. Much of what the school does is, of course, a function of the curriculum and the instructional programs used.

The one-group model described here can be used to evaluate instructional programs such as the DISTAR system when it is impossible or impractical to divide the students into separate experimental and control groups using different programs. The one-group model requires information usually derived as part of the standardization and norming of the tests used in the study. This information essentially enables the entire normative population to be used as a control against which the performance of the students using DISTAR programs can be compared.

A pretest and at least one posttest must be given. The pretest should be administered at the beginning of the period to be evaluated, before the students begin to use the instructional program. A posttest should be given at the end of each evaluation period. In this model, a nationally standardized ability or readiness test is recommended at the beginning of first grade. This pretesting provides the baseline measure for determining the level of performance typically expected of your particular group in later grades. Subsequent testing (the posttesting) should use nationally standardized achievement tests. It is important to remember that the meaningfulness of the analysis will depend in large part on how appropriate the testing instruments are to the objectives of the curriculum being evaluated. For example, you would not want to give a reading readiness test as a pretest and an arithmetic test as a posttest if you were trying to evaluate a social studies curriculum.

The procedures described here originated using data from the recent standardization of the SRA Assessment Survey. Instruments other than these can be used, providing they are adequately standardized on appropriate populations. It is also helpful (but not always possible) to give pretests and posttests that were both part of the same standardization study. National (or norm group) means and standard deviations appropriate to the time of testing should be available for most major testing programs. This information is needed for the one-group model. Tests reporting only raw scores or norms from a local population are not usually appropriate for this model, so they should not be used in this kind of analysis. (See the section on tests in "General Considerations" for suggestions about appropriate testing instruments.)

In evaluating the DISTAR programs using the one-group model, you will compare the actual achievement of your students using the program to what similar students would normally be expected to achieve. You use the pretest scores of the students as baseline data. From the baseline averages you predict the level of achievement that would typically be expected at the end of each period of study. After each posttesting, you compare these expectancies to the actual average levels of achievement obtained by the students. You should make the comparison separately for each area in the posttest.

The model uses t tests and critical ratios for determining statistical significance. Statistical significance lets you know how likely it is that the results might have come about by chance alone. It is generally accepted that if a difference of the sort measured here would occur less than five times out of one hundred by chance, then the difference is statistically significant. This means that you can be at least 95% confident that the difference you report is a real difference. If this is so, the results can, in large part, be attributed to the instructional program your students used.

Comparisons with expectancies involve various assumptions that must be met if the results of the study are to be valid. One assumption is that the population within the schools in the study is fairly consistent from year to year. (But the number of students pretested need not be exactly the same as the number of students posttested.) The model assumes that under normal circumstances the average scores of a group of students will remain in essentially the same position (higher, equal, or lower) relative to the mean of the normative population from grade to grade. We would normally expect a group to continually have average scores approximately the same number of standard deviations from the mean from one year to the next.

If the assumption of consistency of overall student population cannot be met (as in the case of a large new enrollment of students not similar to those with whom the study began), then your analysis should include only those students who have been in the study from the start.

Another assumption that must be recognized is that groups of students who begin at different levels of achievement or ability do not generally increase in achievement at the same rate. By definition, an average group (compared to the norms) typically increases in achievement at an average rate. Above average groups, however, increase their achievement scores at a higher rate. And the rate is lower than average for below average groups.

With scores such as grade equivalents, it was formerly possible to make accurate predictions of expected achievement patterns only for groups that were average in terms of the norms. However, using other kinds of score scales, it has become possible to generalize patterns of achievement for students whose average level starts out different from that of a norm group. Extensive work done with growth scale values during the recent standardization of the SRA Assessment Survey has shown this. So has the work done with the standard score scales used with many other testing programs.

The expectancy tables provided in the last part of this book very clearly illustrate the fact that groups different from the norm increase in achievement at different rates. A group whose baseline is one standard deviation below the norm would be expected to have the average achievement pattern shown in the column headed -1.0 S.D. This pattern differs from the average (indicated in the column headed NATL MEAN), and from the pattern for groups one standard deviation above the norm (the column headed +1.0 S.D.).

Expectancy tables are given for the four major achievement scores provided by the SRA Assessment Survey (Reading, Language Arts, Mathematics, and Composite) in terms of SRA growth scale values. Similar expectancies in terms of generalized grade equivalent scores are provided for Reading and Arithmetic. Note that the grade equivalent expectancy for above average groups is more than one month of achievement for one month of school. For below average groups, it is less than one month per month. Expectancy is one month per month only for groups starting out at the average.

The instructions, worksheets, and tables that follow will help you report these kinds of information about each of the comparisons you make:

* Baseline and norm group means and standard deviations for the time of pretesting, and number of students tested.

* Obtained and norm group means and standard deviations for the time of posttesting, and number of students tested.

* Difference between baseline average and norm group average, critical ratio, and level of significance of the difference.

* Difference between posttest average and norm group average, critical ratio, and level of significance of the difference.

* Expected posttest average, difference between obtained average and expectancy, results of t test, and level of significance of the difference.

If the difference between the actual and the expected mean on the posttest is statistically significant, this information will help provide a good answer to the question of whether the instructional program had an effect on student performance that you would not typically expect from similar students. Obviously if the actual mean is significantly higher than the expected mean, the program had a positive effect. If the difference is not statistically significant, it may well be due to chance factors, and the actual performance of the students should be viewed as essentially equal to that typical of similar students in the entire normative population.

The statistics, of course, cannot tell the whole story. You will probably want to interpret the results (whether the differences are significant or not) in terms of whether the students' overall performance throughout the study was educationally meaningful to the students, the teachers, the administrators, and your educational community. There is no substitute for the considered judgments of the experienced professional educator.

INSTRUCTIONS

Worksheets and tables have been provided for two versions of this model--depending on the data available from your testing program. The first set of worksheets shows how the analysis can be run if you are using growth scale values from the SRA Assessment Survey as the posttest measure and have used a pretest for which means and standard deviations for the time of testing are available. Reference tables for the SRA growth scale values are provided. The same kind of analysis can, of course, be run using standard scores from other tests for which similar data have been reported. The essential data are the means and standard deviations for the norm group appropriate for the grade and time of testing.

The second set of worksheets shows how the analysis can be approximated if the scores on the posttest you administer are reported in growth scale values or in grade equivalents. (While it is statistically less precise, the short method in the second set of worksheets will certainly be adequate if the differences obtained are educationally meaningful.)

One additional set of worksheets is provided here. This set shows an appropriate method for computing the means and standard deviations needed for the comparative analysis. Many test users will find this set unnecessary, since most test scoring services can report the necessary means and standard deviations as part of the summary reports for the testing program.

Reference tables (some abbreviated for simplicity) related to all the worksheets appear at the end of this book. If these tables prove to be insufficient in your specific study, you can usually find the further information you need in standard statistical references or in the technical information published for the tests you are using.

The results of the analysis can be presented in a summary table like the one shown below. In that table the line numbers refer to the lines in the worksheets for the complete analysis. A similar, but shorter table can be constructed if an abbreviated or approximated form of the analysis is used. (Note that the entries in parentheses are optional. They can be eliminated from the table if they are not required for the purposes of your study.)

SUMMARY COMPARISON OF ACTUAL AND EXPECTED ACHIEVEMENT

	BASELINE	POSTTEST
DISTAR GROUP RESULTS		
Mean	Line 1*	Line 10*
Standard Deviation	Line 2	Line 11*
No. of Students	Line 3	Line 12*
NORM POPULATION		
Mean	Line 4*	Line 13*
Standard Deviation	Line 5*	Line 14*
(COMPARISON WITH NORM GROUP)		
(Obtained - Norm)	(Line 6)*	(Line 15)
(Critical Ratio)	(Line 9)	(Line 18)
(Confidence Level)	(Line 26)	(Line 27)

EXPECTANCY ANALYSIS

Expected mean	Line 21
Obtained - Expected	Line 22
t ratio	Line 25
Confidence Level	Line 31

*Required for expectancy analysis.

COMPLETE ANALYSIS -- A STEP BY STEP WORKSHEET

If the appropriate means and standard deviations required for this analysis are not available with your score reports or group listings, there are worksheets later in this section that will help you compute the needed figures. Remember that this analysis should be made separately for each content area and for each posttest being analyzed.

The following steps will provide you with the data for the summary table for each comparison in your report. All you need to do is fill in the values or perform the computations specified for the lines in the worksheet. Some of the steps are optional, since they do not directly relate to the basic comparison of actual and expected achievement. These steps are indicated as (Optional). You may find them desirable, however, in making a complete report. Data used in the summary report are indicated by asterisks (*).

Line 1: Enter the average (mean) pretest score obtained by the group. *_____ 1

Line 2: Enter the standard deviation of the pretest scores obtained by the group. *_____ 2

Line 3: Enter the number of students used in calculating the pretest mean. *_____ 3

Line 4: Enter the average score (mean) for the norm group for the grade and month of pretesting. Consult Table 1 to determine the month. Then find the appropriate mean in the technical data for the test used. If your pretest provided growth scale values for the SRA Assessment Survey (Achievement Series), consult tables 2 through 5. *_____ 4

Line 5: Enter the standard deviation for the norm group for the year and month of testing. Consult tables, etc., as described for line 4, if necessary. *_____ 5

Line 6: Subtract Line 4 from Line 1. (The result will be a negative number if the group's average for the pretest was less than that of the norm group.) *_____ 6

Line 7: (Optional) Enter the square root of the value in Line 3. (Table 6, an abbreviated square root table, may be of assistance.)

_____ 7

Line 8: (Optional) Multiply Line 6 by Line 7. (The result may be a negative number.)

_____ 8

Line 9: (Optional) Divide Line 8 by Line 5. (The result may be a negative number.)

_____ 9

Line 10: Enter the average (mean) posttest score obtained by the group.

*_____10

Line 11: Enter the standard deviation of the posttest scores obtained by the group.

*_____11

Line 12: Enter the number of students used in calculating the posttest mean.

*_____12

Line 13: Enter the average score (mean) for the norm group for the grade and month of posttesting. Consult Table 1 to determine the month. Then find the appropriate mean in the technical data for the test used. If your posttest provided growth scale values for the SRA Assessment Survey (Achievement Series), consult tables 2 through 5.

*_____13

Line 14: Enter the standard deviation for the norm group for the year and month of posttesting. Consult tables, etc., as described in Line 13, if necessary.

*_____14

Line 15: (Optional) Subtract Line 13 from Line 10. (The result will be a negative number if the group's average for the posttest was less than that of the norm group.)

*_____15

Line 16: (Optional) Enter the square root of the value in Line 12. (Table 6, an abbreviated square root table, may be of assistance.)

_____16

Line 17: (Optional) Multiply Line 15 by Line 16. (The result may be a negative number.)

_____17

Line 18: (Optional) Divide Line 17 by Line 14. (The result may be a negative number.)

*_____18

Line 19: Divide Line 6 by Line 5. (The result will be a negative number if the group's average for the pretest was less than that of the norm group.)

_____19

Line 20: Multiply Line 19 by Line 14. (The result will be a negative number if Line 19 is a negative number.)

_____20

Line 21: Add Line 20 to Line 13. (If the value in Line 20 is a negative number, treat it as a positive number and subtract it from Line 13.)

*_____21

Line 22: Subtract Line 21 from Line 10. (If the value in Line 21 is less than the value in Line 10, the result will be a negative number.)

*_____22

Line 23: Enter the square root of the value in Line 12. (Table 6, an abbreviated square root table, may be of assistance.)

_____23

Line 24: Multiply Line 22 by Line 23. (The result will be a negative number if Line 22 is a negative number.)

_____24

Line 25: Divide Line 24 by Line 11. This is the value of the t ratio. (It will be negative if Line 24 is negative.)

*_____25

Line 26: (Optional) Line 9 is the critical ratio for the comparison of obtained pretest scores with the average for the norm group. If Line 9 was calculated, consult Table 7 and enter the level of confidence for the value in Line 9.

*_____26

Line 27: (Optional) Line 18 is the critical ratio for the comparison of obtained posttest scores with the average for the norm group. If Line 18 was calculated, consult Table 7 and enter the level of confidence for the value in Line 18.

*_____27

Line 28: Subtract 1 from the value in Line 12. This result represents the degrees of freedom considered in determining whether the difference between the actual mean and the expectancy is statistically significant.

_____28

Line 29: Consult Table 8. Find the row in which the number in the first column is equal to the value in Line 28. If Line 28 is between two of the values in this table, choose the row with the lower value. Enter here the number in the second column in the row you have picked (the column headed 95% confidence level).

_____29

Line 30: Following instructions for Line 29, enter here the number in the third column of Table 8 in the row you have picked (the column headed 99% confidence level).

_____30

Line 31: Treat the value in Line 25 as a positive number (even if it is not). If this value is greater than or equal to the value in Line 30, enter 99% here. If Line 25 (treated as positive) is greater than or equal to the value in Line 29 but less than the value in Line 30, enter 95% here. If it is less than Line 29, write "not significant" here.

*_____31

Your statistical analysis is now complete, and you are ready to put your results in a table summarizing your comparison of actual posttest achievement with expectancy.

SHORT METHOD -- A STEP-BY-STEP WORKSHEET

This method of comparing actual posttest averages with expectancy is useful when detailed data on the norm group means and standard deviations are not readily available. It is also suitable for situations where the posttest scores to be analyzed are expressed as grade equivalent scores. Using this method, you can look up many of the required values in the tables we have provided, rather than having to calculate them.

Less initial information is needed to perform the analysis this way. You only need (1) the average pretest score expressed as an IQ, a stanine, or a score that can be converted to a percentile; (2) the average posttest score expressed as a growth scale value or a grade equivalent; (3) the posttest standard deviation (expressed in the same units as the mean); and (4) the number of students posttested. The worksheet following this short method show how to compute the means and standard deviations. Use these instructions if your score reports do not already give the information for the exact group of students being analyzed.

Line 1: Enter the average (mean) protest score obtained by the group.

*_____ 1

Line 2: If the score in Line 1 is a stanine or an IQ, skip to Line 3. Otherwise use the norms tables for the pretest and find the national percentile (appropriate for the time of testing) corresponding to the value in Line 1.

_____ 2

Line 3: Use Table 9, a condensed conversion table. If the entry in Line 1 is a stanine, find the row in the third column of table 9 that has the number closest to the value in Line 1. Enter here the value shown in the first column of that row.

If the entry in Line 1 is an IQ, find the closest entry in the fourth column of Table 9 and enter the corresponding value from the first column.

If you entered a percentile in Line 2, find the closest value to it in the second column of Table 9, and enter the corresponding value from the first column here.

_____ 3

Line 4: Enter the grade and month of the posttesting here. Determine the month of testing by using Table 1.

_____ 4

Line 5: If your posttest scores are growth scale values, you should use the growth scale expectancy table for the subject area (table 10, 11, 12, or 13) for this step.

If your posttest scores are grade equivalents, you should use the appropriate generalized expectancy table for grade equivalents (table 14 or 15).

In the expectancy tables the first two columns show grade and month of testing. Find the row corresponding to the grade and month of testing. From that row enter here the number in the column that has a heading corresponding to the value in Line 3.

*_____ 5

Line 6: Enter the average (mean) posttest score obtained by the group.

*_____ 6

Line 7: Enter the standard deviation of the posttest scores obtained by the group.

*_____ 7

Line 8: Enter the number of students used in calculating the posttest mean.

*_____ 8

Line 9: Enter the square root of the value in Line 8. (Table 6, an abbreviated square root table, may be of assistance.)

_____ 9

Line 10: Subtract Line 6 from Line 5. (The result will be a negative number if the group's posttest average was below expectancy.)

*_____10

Line 11: Multiply Line 9 by Line 10. (The result will be a negative number if Line 10 is negative.)

_____11

Line 12: Divide Line 11 by Line 7. This is the value of the t ratio. (It will be negative if Line 11 is negative.)

*_____12

Line 13: Subtract 1 from the value in Line 8. This result represents the degrees of freedom considered in determining whether the difference between the actual mean and the expectancy is statistically significant.

_____13

Line 14: Consult Table 8. Find the row in which the number in the first column is equal to the value in Line 13. If Line 13 is between two of the values in this table, choose the row with the lower value. Enter here the number in the second column in the row you have picked (the column headed 95% confidence level).

_____14

Line 15: Following instructions for Line 14, enter here the number in the third column of Table 8 in the row you have picked (the column headed 99% confidence level).

_____15

Line 16: Treat the value in Line 12 as a positive number (even if it is not). If this value is greater than or equal to the value in Line 15, enter 99% here. If Line 12 (treated as positive) is greater than or equal to the value in Line 14 but less than the value in Line 15, enter 95% here. If it is less than Line 14, write "not significant" here.

*_____16

This completes the short version of the statistical analysis. The following lines from the two methods are equivalent for the purposes of making a summary table:

DATA	SHORT METHOD	COMPLETE ANALYSIS
Baseline Mean	Line 1	Line 1
Posttest Mean	Line 6	Line 10
Posttest S.D.	Line 7	Line 11
Posttest N	Line 8	Line 12
Expectancy	Line 5	Line 21
Obtained-Expectancy	Line 10	Line 22
t ratio	Line 12	Line 25
Confidence Level	Line 16	Line 31

WORKSHEET FOR MEANS AND STANDARD DEVIATIONS

If you do not have a score report showing the means and standard deviations of the test scores for the exact group of students you are studying, you must compute these data. You need them for both the pretest and the posttest. The first step is to make a table like the one below. Column 1 in this table is a list of the students' names. Column 2 should show the test score attained by each student. For the third column, square the values in Column 2 (that is, multiply each student's score by itself) and write the result in Column 3.

Then follow the rest of the steps line by line. Lines 1, 4, and 10 -- the lines marked with an asterisk (*) -- are the data you need for the comparison analysis: number of students, mean, and standard deviation.

(1) STUDENT	(2) SCORE	(3) SCORE SQUARED
Daniel	_____	_____
Isaac	_____	_____
Sara	_____	_____
Terrie	_____	_____
Alex	_____	_____
Rowena	_____	_____
TOTALS	_____	_____

Line 1: Count the number of students for whom you listed scores. Enter that number here.

*_____ 1

Line 2: Add all the scores in Column 2. Enter the total here.

_____ 2

Line 3: Add all the numbers in Column 3. Enter the total here.

_____ 3

Line 4: Divide Line 2 by Line 1. This value is the mean, or average, score for the group.

*_____ 4

Line 5: Square the value in Line 2.

_____ 5

Line 6: Divide Line 5 by Line 1.

_____ 6

Line 7: Subtract Line 6 from Line 3.

_____ 7

Line 8: Subtract 1 from the value in line 1.

_____ 8

Line 9: Divide Line 7 by Line 8.

_____ 9

Line 10: Take the square root of the value in Line 9. (Table 6 may be of assistance.) The result is the standard deviation of the scores for the group.

*_____ 10

AN EXAMPLE OF THE ONE-GROUP MODEL ANALYSIS METHOD

In one school district the first grade students in all classrooms were given the Short Test of Educational Ability in September, before they started using the DISTAR system. The mean IQ of these 297 students was 84.3, and the standard deviation of the scores was 15.2. At the end of second grade -- after they had been using DISTAR Reading I and DISTAR Reading II for two years -- they were tested with the Primary I level of the SRA Assessment Survey. In Reading the mean growth scale value for the 291 students tested was 155, with a standard deviation of 46.

The next page shows the table that results from the analysis. Following the table is the analysis that was done using the step-by-step worksheets.

SAMPLE COMPARISON OF ACTUAL AND EXPECTED ACHIEVEMENT

	BASELINE	POSTTEST
DISTAR GROUP RESULTS		
Mean	84.3	155
Standard Deviation	15.2	46
No. of Students	297	291
NORM POPULATION		
Mean	100	197
Standard Deviation	16	55
COMPARISON WITH NORM GROUP		
Obtained - Norm	-15.7	-42
Critical Ratio	-2.70	-13.06
Confidence Level	99%	99%

EXPECTANCY ANALYSIS

Expected Mean	143.1
Obtained - Expected	11.9
t ratio	4.42
Confidence Level	99%

LINE	DESCRIPTION	
[1]	84.3	From pretest summary report, mean
[2]	15.2	From pretest summary report, s.d.
[3]	297	From pretest summary report, N
[4]	100	National mean, from test manual
[5]	16	National s.d., from test manual
[6]	[1]-[4]	84.3-100=-15.7
[7]	Square root of [3]	$\sqrt{297}$=17.2 from Table 6
[8]	[6]x[7]	-15.7x17.2=-270.04
[9]	[8]÷[5]	-270.04÷16=-16.88 (pretest critical ratio)
[10]	155	From posttest summary report, mean
[11]	46	From posttest summary report, s.d.
[12]	291	From posttest summary report, N
[13]	197	From Table 2, mean for grade 2, month 9
[14]	55	From Table 2, s.d. for grade 2, month 9
[15]	[10]-[13]	155-197=-42
[16]	Square root of [12]	$\sqrt{291}$=17.1 from Table 6
[17]	[15]x[16]	-42x17.1=-718.2
[18]	[17]÷[14]	-718.2÷55=-13.06 (posttest critical ratio)
[19]	[6]-[5]	-15.7-16=-0.98
[20]	[19]x[14]	-0.98x55=-53.9
[21]	[20]+[13]	-53.9+197=143.1
[22]	[10]-[21]	155-143.1=11.9
[23]	Square root of [12]	$\sqrt{291}$=17.1 from Table 6
[24]	[22]x[23]	11.9x17.1=203.49
[25]	[24]÷[11]	203.49÷46=4.42 (t ratio)

[26]	99 %	[9] From Table 7
[27]	99 %	[18] From Table 7
[28]	[12]-1	291-1=290
[29]	1.97	[28] From second column of Table 8
[30]	2.59	[28] From third column of Table 8
[31]	99 %	[25] As positive, greater than [30]

FORMULAS USED FOR COMPARISON OF ACTUAL AND EXPECTED ACHIEVEMENT

	BASELINE	POSTTEST
DISTAR GROUP RESULTS		
MEAN	M_1	M_2
STANDARD DEVIATION	S_1	S_2
NO. OF STUDENTS	N_1	N_2
NORM POPULATION		
MEAN	$\underline{M}_1$	$\underline{M}_2$
STANDARD DEVIATION	$\underline{S}_1$	$\underline{S}_2$
COMPARISON WITH NORM GROUP		
OBTAINED - NORM	$D_1 = M_1 - \underline{M}_1$	$D_2 = M_2 - \underline{M}_2$
CRITICAL RATIO	$Z_1 = \frac{D_1\sqrt{N_1}}{S_1}$	$Z_2 = \frac{D_2\sqrt{N_2}}{S_2}$

- - - - - - - - - - - - - - - - - -

EXPECTANCY ANALYSIS	
EXPECTED MEAN	$M_{exp} = \frac{D_1 \underline{S}_2}{S_1} + M_2$
OBTAINED - EXPECTED	$D_{exp} = M_2 - M_{exp}$
t RATIO	$t = \frac{D_{exp}\sqrt{N_2}}{S_2}$
DEGREES OF FREEDOM	$df = N_2 - 1$

C. THE TWO-GROUP MODEL

--by Rita M. Karwacki

COMPARISON OF TWO INSTRUCTIONAL PROGRAMS

In comparing the effect of using one instructional program rather than another, a technique is needed that would help determine if one program (in this case, the DISTAR system) is "better" than another instructional program.

A standard statistical procedure called analysis of covariance can help answer the question, "Is the average performance of students in the DISTAR Instructional System significantly different on standardized achievement tests from that of comparable students using another instructional program?" Essentially this procedure assumes that the two groups under study are not perfectly comparable and makes adjustments in the posttest scores to make the two groups statistically comparable. This adjustment takes into account initial differences that existed in the groups prior to exposure to the instructional programs used.

Suppose the two groups were administered reading readiness tests prior to exposure to two different reading programs, and were administered a reading achievement test after two and/or three years of exposure to their respective programs. Differences in the performance of the two groups on the reading achievement posttest would, in part, be attributable to the reading program used. This attribution can be made because the procedure adjusts the groups' achievement scores to take into account any differences in readiness that existed between them prior to exposure to their reading programs.

In order to make comparisons of achievement test performance of students in two different instructional programs, pretest and posttest scores are required for students in both groups. The specifications of the testing are as follows:

* appropriate tests administered prior to and after exposure to the programs used;
* the same testing instruments used for both groups;
* testing instruments administered at the same time for both groups; and
* testing instruments which are consistent for the duration of the study.

In this instance, appropriate tests are instruments that are designed to measure readiness, educational ability, or achievement for that particular time within grade. Pretests for first grade students could be readiness or educational ability tests; spring testing for first grade students (if used) should be with achievement tests. For second and third grade students, both the fall tests (if used) and the posttests should be achievement tests. (See the section on testing in "General Considerations" for a list of appropriate tests you might want to use.)

As illustrated in "Testing and Instruction Plan for a Two-Group Model," data analysis should not begin before the second year of exposure to the instructional programs. Because of the nature of the sampling of content in the testing instruments, it is important to consider when a particular outcome should be expected in different instructional programs. A given test may be sampling that outcome at different points in time. One program may teach a concept at a different time than another. This is especially true in the lower grades, where the sequence of introduction of concepts and skills varies most. For the data analysis, the pretest measure must be a test given prior to exposure to the instructional programs.

The detailed worksheets and tables provided show you how to perform the analysis of covariance. To perform the analysis, you will need pretest and posttest scores for all students in both groups. The best type of score unit to use in this analysis is a raw score or growth scale value. These are absolute units. It is less desirable to use relative units (scores depending on comparison to some norm-referenced group), such as grade equivalents or stanines. Percentiles are not appropriate for this analysis.

Using the worksheets, you can make a comparison of the performance of two groups of students using different instructional programs on one test score at a time. If you wish to compare the performance of both groups on more than one variable (test score), the analysis must be run separately for each variable to be analyzed.

(The use of a calculating machine capable of multiplication and division will speed up the calculations.)

Using the detailed worksheets and tables provided, the following information can be obtained:

* pretest mean and standard deviation for the DISTAR group;
* posttest mean and standard deviation for the DISTAR group;
* pretest mean and standard deviation for the non-DISTAR group;
* posttest mean and standard deviation for the non-DISTAR group;
* F ratio of difference in performance between the two groups; and,
* level of confidence for the F ratio obtained.

The difference in performance between groups will be statistically significant if the level of confidence for the F ratio exceeds 95 percent. This would be interpreted to mean that a difference of that magnitude would occur by chance less than 5 times out of 100. As the level of confidence increases toward or beyond the 99 percent level of confidence, so does the likelihood that the results obtained were not due to chance factors.

In evaluating the comparison of the achievement test performance of both groups, a statistically significant difference could be interpreted to mean that the difference in student performance was due to the different instructional programs used. If the difference is not statistically significant, it may be due to chance, and should usually be interpreted to mean that both instructional programs impacted students' performance equally.

PRELIMINARY WORKSHEET

Steps to be taken prior to actual analysis:

Step 1: Table the data as illustrated, allowing five columns for each group. The first column (Column X) should contain the pretest score; the second column (Column Y) should contain the posttest score. If any student is missing either score, eliminate him from the analysis.

DISTAR GROUP

	(1) X	(2) Y	(3) XSQ	(4) YSQ	(5) XY
Joe	---	---	---	---	---
Jack	---	---	---	---	---
Sue	---	---	---	---	---
Jimmy	---	---	---	---	---
Jean	---	---	---	---	---
Sums	---	---	---	---	---

NON-DISTAR GROUP

	(1) X	(2) Y	(3) XSQ	(4) YSQ	(5) XY
Sam	---	---	---	---	---
Sarah	---	---	---	---	---
Amy	---	---	---	---	---
Susan	---	---	---	---	---
Peter	---	---	---	---	---
Mike	---	---	---	---	---
Sums	---	---	---	---	---

Step 2: Square all the numbers in columns 1 and 2 for the DISTAR group and enter the products in columns 3 and 4 respectively.

Step 3: Square all the numbers in columns 1 and 2 for the non-DISTAR group and enter the products in columns 3 and 4 respectively.

Step 4: Multiply each number in column 1 by its paired number in column 2 for the DISTAR group.

Step 5: Multiply each number in column 1 by its paired number in column 2 for the non-DISTAR group.

Step 6: Add the scores in all five columns for the DISTAR group.

Step 7: Add the scores in all five columns for the non-DISTAR group and write them in the row called "sums."

For the analysis, these sums will be referred to as follows:

column 1 = sum of X
column 2 = sum of Y
column 3 = sum of XSQ
column 4 = sum of YSQ
column 5 = sum of XY

The following step-by-step example shows the procedures to be followed once the preliminary worksheet has been completed.

STEP-BY-STEP EXAMPLE

This example is based on two similar groups of students who were tested at the beginning of first grade with the SRA Primary Mental Abilities test. One group then used the DISTAR Reading program through first and second grades. The other group used a traditional reading program. Both groups were tested at the end of second grade with a well-known reading achievement test that provided individual scores in grade equivalents.

The preliminary worksheet was prepared using raw scores from the PMA as the pretest scores (column X) and grade equivalents from the achievement test as the posttest scores (column Y). A separate preliminary worksheet was prepared for each group. Only students who had been in the program throughout the first and second grades and for whom both test scores were available were included in these worksheets.

The two parts of the analysis are explained with examples using the sample data. The first part of the analysis is to calculate descriptive statistics. The second part uses the calculations from the descriptive statistics to perform an analysis of covariance. This part statistically adjusts the posttest means to account for differences in the average pretest scores and computes an F-ratio to help determine whether the difference in the adjusted posttest means is significant.

Line numbers in the following examples are enclosed in square brackets [like this], in statements like "Subtract one from [1]. If the value for line [1] is 17, then the statement tells you to subtract 1 from 17 (17-1=16).

In the steps for calculating the descriptive statistics, there are three columns of numbers--the first refers to the DISTAR group, the second to the non-DISTAR group, and the last to the total of both groups combined. Calculations beginning with line [7] should be done for each column separately. A notation that shows a line number and a letter refers to a column within a line. For instance, [1D], [1N], and [1T] refer respectively to the line [1] values for the DISTAR, non-DISTAR, and Total columns.

EXAMPLE OF PRELIMINARY WORKSHEET

DISTAR GROUP

(1) X	(2) Y	(3) XSQ	(4) YSQ	(5) XY
102	4.6	10404	21.16	469.2
86	3.9	7396	15.21	335.4
89	3.1	7921	9.61	275.9
84	4.2	7056	17.64	352.8
77	3.0	5929	9.00	231.0
80	3.8	6400	14.44	304.0
74	2.9	5476	8.41	214.6
79	2.7	6241	7.29	213.3
SUMS: 671	28.2	56823	102.76	2396.2

NON-DISTAR GROUP

(1) X	(2) Y	(3) XSQ	(4) YSQ	(5) XY
70	2.4	4900	5.76	168.0
75	2.4	5625	5.76	180.0
97	2.5	9409	6.25	242.5
45	2.5	2025	6.25	112.5
50	2.7	2500	7.29	135.0
81	2.7	6561	7.29	218.7
77	2.5	5929	6.25	192.5
100	3.0	10000	9.00	300.0
80	2.5	6400	6.25	200.0
SUMS: 675	23.2	53349	60.10	1749.2

THE INITIAL SUMMARY:

[1]: In the DISTAR column [1D], write the number of students in the DISTAR group. In the non-DISTAR column [1N], write the number of students in the non-DISTAR group. In the Total column [1T], write the total number of students [1D] + [1N].

[2] through [6]: In the DISTAR column copy the sum of X, sum of Y, sum of XSQ, sum of YSQ, and sum of XY from the preliminary worksheet for the DISTAR group. In the non-DISTAR column copy these sums from the worksheets for the non-DISTAR group. For each line in the Total column, add the values in the DISTAR and the non-DISTAR columns:

[2T] = [2D] + [2N]
[3T] = [3D] + [3N]
[4T] = [4D] + [4N]
[5T] = [5D] + [5N]
[6T] = [6D] + [6N]

PRETEST DESCRIPTIVE STATISTICS:

[7]: This step (and all steps through line [25]) should be done separately for each column. For line [7] you should subtract 1 from line [1], for each column. Instead of writing

[7D] = [1D] - 1
[7N] = [1N] - 1
[7T] = [1T] - 1

This step can be summarized as [7] = [1] - 1.

[8]: Square the values in line [2]. [8] = [2] x [2].

[9]: Divide [8] by [1]. [9] = [8] ÷ [1].

[10]: Subtract [9] from [4]. [10] = [4] - [9].

[11]: Divide [10] by [7].

[12]: Take the square root of [11]. [12D] and [12N] are the pretest standard deviations for the DISTAR and the non-DISTAR groups.

[13]: Divide [2] by [1]. [13D] and [13N] are the pretest means (averages) for the DISTAR and non-DISTAR groups.

POSTTEST DESCRIPTIVE STATISTICS:

[14]: Square the values in line [5].
[15]: Divide [14] by [1].
[16]: Subtract [15] from [5].
[17]: Divide [16] by [7].
[18]: Take the square root of [17]. [18D] and [18N] are the posttest standard deviations.
[19]: Divide [5] by [1]. [19D] and [19N] are the posttest means.

CORRELATION OF PRETEST AND POSTTEST SCORES:

[20]: Multiply [2] by [5].
[21]: Divide [20] by [1].
[22]: Subtract [21] from [6].
[23]: Divide [22] by [7].
[24]: Multiply [12] by [18].
[25]: Divide [23] by [24]. [25D] and [25N] are the correlations between the pretest and posttest scores for the DISTAR and the non-DISTAR groups.

The results of the calculations for steps 1 through 25 are shown on the next page.

INITIAL SUMMARY

	DISTAR [D]	NON-DIST [N]	TOTAL [T]	
[1]	8.000	9.000	17.000	N
[2]	671.000	675.000	1346.000	sum of X
[3]	28.200	23.200	51.400	sum of Y
[4]	56823.000	53349.000	110172.000	sum of XSQ
[5]	102.760	60.100	162.860	sum of YSQ
[6]	2396.200	1749.200	4145.400	sum of XY

PRETEST DESCRIPTIVE STATISTICS

[7]	7.000	8.000	16.000	[1] - 1
[8]	450241.000	455625.000	1811716.000	[2] squared
[9]	56280.125	50625.000	106751.529	[8] ÷ [1]
[10]	542.875	2724.000	3600.471	[4] - [9]
[11]	77.554	340.500	225.029	[10] ÷ [7] (variance)
[12]	8.806	18.453	15.001	square root of [11] (S.D.)
[13]	83.875	75.000	79.176	[2] ÷ [1] (mean)

POSTTEST DESCRIPTIVE STATISTICS

[14]	795.240	538.240	2641.960	[3] squared
[15]	99.405	59.804	155.409	[14] ÷ [1]
[16]	3.355	0.296	7.451	[5] - [15]
[17]	0.379	0.037	0.466	[16] ÷ [7] (variance)
[18]	0.692	0.192	0.682	square root of [17] (S.D.)
[19]	3.525	2.578	3.024	[3] ÷ [1] (mean)

CORRELATION OF PRETEST AND POSTTEST SCORES

[20]	18992.200	15660.000	69184.400	[2] x [3]
[21]	2365.275	1740.000	4069.671	[20] ÷ [1]
[22]	30.925	9.200	75.729	[6] - [21]
[23]	4.418	1.150	4.733	[22] ÷ [7] (covariance)
[24]	6.097	3.547	10.237	[11] x [18]
[25]	0.725	0.324	0.462	[23] ÷ [24] (correlation)

ANALYSIS OF COVARIANCE AND F - TEST:

[26]: This step and all the remaining steps will be done only once each. Some of the steps refer to particular columns in the previous calculations. The values needed will be identified by the line number and the column letter. For this line you should square the value in the Total column from the previous step. Thus [26] = [25T] x [25T].
[27]: Subtract [26] from one. [27] = 1 - [26].
[28]: Multiply [16T] by [27]. This value is the total sum of squares needed for the summary table.

[29]: Add [10D] to [10N].
[30]: Add [16D] to [16N].
[31]: Add [22D] to [22N].
[32]: Square [31].
[33]: Divide [32] by [29].
[34]: Subtract [33] from [30]. This value is the error sum of squares needed for the summary table.

[35]: Divide [31] by [29].
[36]: Subtract [13T] from [13D].
[37]: Multiply [35] by [36].
[38]: Subtract [37] from [19D]. This value is the adjusted posttest mean for the DISTAR group.

[39]: Subtract [13T] from [13N].
[40]: Multiply [35] by [39].
[41]: Subtract [40] from [19N]. This value is the adjusted posttest mean for the non-DISTAR group.

[42]: Subtract two from [1T]. This value is the total degrees of freedom.
[43]: Subtract one from the number of groups. Since there are two groups, 2 - 1 = 1. This is the degrees of freedom for treatments.
[44]: Subtract [43] from [42]. This is the error degrees of freedom.
[45]: Subtract [34] from [28]. This is the treatment sum of squares.
[46]: Divide [34] by [44]. This is the value for the error mean squares.
[47]: Divide [45] by [43]. This is the value for the treatment mean squares.
[48]: Divide [47] by [46]. This is the value for the F-ratio for determining the significance of the difference between the adjusted means.

[49]: Look up the value obtained for [44] in the "DF" column of Table 16. If [44] is between two of the values in the "DF" column, select the next lower value as "DF" and copy the number in the second column (95%).

[50]: Copy the value in the third (99%) column of Table 16 for the "DF" used in the previous step.

[51]: If [48] is less than [49], the difference between adjusted means is not significant, so "not significant" should be entered here.
If [48] is greater than or equal to [50], enter 99% as the confidence level here.
If [48] is greater than or equal to [49] and less than [50], enter 95% as the confidence level here.

The results of the calculations for steps 26 through 51 are shown on the next page.

ANALYSIS OF COVARIANCE AND F - TEST

[26]	0.214	[25T] squared
[27]	0.786	1 - [26]
[28]	5.858	[16T] x [27] (total sum of squares)
[29]	3266.875	[10D] + [10DN]
[30]	3.651	[16D] + [16N]
[31]	40.125	[22D] + [22N]
[32]	1610.016	[31] squared
[33]	0.493	[32] ÷ [29]
[34]	3.158	[30] - [33] (error sum of squares)
[35]	0.012	[31] ÷ [29]
[36]	4.699	[13D] - [13T]
[37]	0.058	[35] x [36]
[38]	3.467	[19D] - [37] (adjusted DISTAR posttest mean)
[39]	-4.176	[13N] - [13T]
[40]	-0.051	[35] x [39]
[41]	2.629	[19N] - [40] (adjusted non-DISTAR posttest mean)
[42]	15.000	[1T] - 2 (total degrees of freedom)
[43]	1.000	number of groups minus 1 (treatment df)
[44]	14.000	[42] - [43] (error df)
[45]	2.700	[28] - [34] (treatment sum of squares)
[46]	0.226	[34] ÷ [44] (error mean squares)
[47]	2.700	[45] ÷ [43] (treatment mean squares)
[48]	11.971	[47] ÷ [46] (f ratio)
[49]	4.600	95 percent level for [44] degrees of freedom
[50]	8.870	99 percent level for [44] degrees of freedom
[51]	99.000	(percent level of confidence of f artio [48])

SAMPLE SUMMARY TABLE

This table shows the values obtained for the sample data and [in brackets] the locations in the step-by-step process where the values were obtained.

	DISTAR GROUP		NON-DISTAR GROUP	
Number of Students	8	[1D]	9	[1N]
Pretest Summary				
Mean	83.675	[13D]	75.000	[13N]
S.D.	8.806	[12D]	18.453	[12N]
Posttest Summary				
Mean	3.525	[19D]	2.578	[19N]
S.D.	0.692	[18D]	0.192	[18N]
Correlation between Pre- and Posttest	0.725	[25D]	0.324	[25N]
Adjusted Posttest Means	3.467	[38]	2.629	[41]

ANALYSIS OF COVARIANCE

Source	SS		DF		MS	
Total	5.858	[28]	15	[42]		
Error	3.158	[34]	14	[44]	0.226	[46]
Treatments	2.700	[45]	1	[43]	2.700	[47]

F-Ratio of 11.971 [48] is significant at the 99 percent [51] level of confidence.

TECHNICAL NOTE

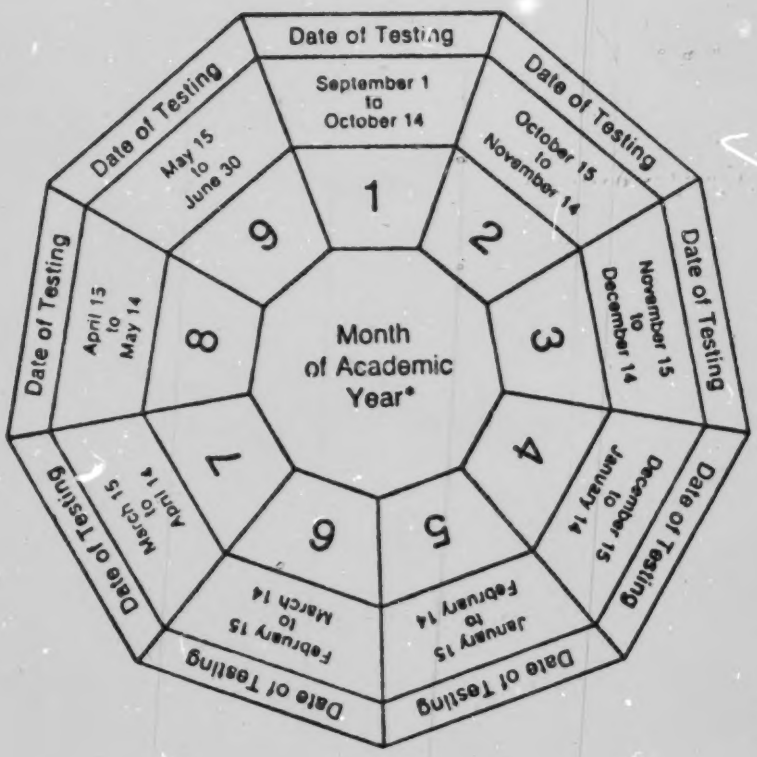
The instructions for the use of analysis of covariance with two groups presented here can be readily extended to three or more groups, since the two-group model is but one instance of the technique.

Examples can be found in standard statistical reference books such as B. J. Winer's STATISTICAL PRINCIPLES IN EXPERIMENTAL DESIGN (New York: McGraw-Hill, 1971).

REFERENCE TABLES

TABLE 1

WITHIN-GRADE PLACEMENT



* IF YOUR SCHOOL YEAR IS ATYPICAL, DETERMINE THE WITHIN-GRADE PLACEMENT BY COUNTING THE NUMBER OF MONTHS THAT HAVE ELAPSED BETWEEN THE BEGINNING OF THE ACADEMIC YEAR AND THE DATE OF TESTING.

TABLE 2

READING SCORE: SRA ASSESSMENT SURVEY NATIONAL GROWTH SCALE VALUES

MEANS

GRD↓ MON→	1	2	3	4	5	6	7	8	9
1	98	104	110	116	122	128	134	140	146
2	152	158	164	170	175	181	186	192	197
3	203	208	214	219	223	228	232	237	241
4	246	250	255	259	263	266	270	274	278
5	281	285	289	292	296	299	302	306	309
6	312	316	319	322	325	327	330	333	336
7	338	341	344	346	349	351	354	356	359
8	361	364	366	368	370	372	374	377	379
9	381	383	385	387	389	391	393	395	398
10	400	402	404	406	409	411	413	416	418
11	420	423	425	427	428	430	432	433	435
12	437	439	440	442	443	445	447	448	450

STANDARD DEVIATIONS

GRD↓ MON→	1	2	3	4	5	6	7	8	9
1	47	48	48	48	49	49	50	50	51
2	51	52	52	52	53	53	54	54	55
3	55	56	56	56	57	57	58	58	59
4	59	60	60	60	60	61	61	61	61
5	62	62	62	62	62	62	62	62	62
6	62	62	62	62	62	62	62	62	62
7	62	62	62	62	62	62	62	62	62
8	62	62	62	62	62	62	62	62	62
9	62	62	62	62	62	62	62	63	63
10	63	63	63	63	63	64	64	64	64
11	65	65	65	65	65	65	65	66	66
12	66	66	66	66	66	66	66	67	67

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TABLE 3

MATHEMATICS SCORE: SRA ASSESSMENT SURVEY NATIONAL GROWTH SCALE VALUES

MEANS

GRD↓ MON→	1	2	3	4	5	6	7	8	9
1	116	120	124	128	132	137	141	145	149
2	154	158	162	167	172	177	182	186	191
3	196	201	206	211	216	222	227	232	237
4	243	248	253	257	261	266	270	274	278
5	283	287	291	295	299	303	307	311	315
6	319	323	327	331	335	338	342	346	350
7	353	357	361	364	367	370	373	377	380
8	383	386	389	392	394	397	399	402	404
9	407	409	412	414	416	419	421	423	425
10	428	430	432	435	437	440	442	445	447
11	450	452	455	456	457	459	460	461	462
12	464	465	466	467	468	470	471	472	473

STANDARD DEVIATIONS

GRD↓ MON→	1	2	3	4	5	6	7	8	9
1	26	26	26	26	26	27	27	27	27
2	28	28	28	29	30	30	31	32	33
3	33	34	35	36	37	38	39	41	42
4	43	44	45	46	47	48	49	49	50
5	51	52	53	54	55	56	57	57	58
6	59	60	61	62	63	64	65	66	67
7	68	69	70	71	72	72	73	74	75
8	75	76	77	77	78	78	79	79	80
9	80	81	81	81	82	82	83	83	84
10	84	85	85	86	87	87	88	89	90
11	90	91	92	92	93	93	93	94	94
12	94	95	95	95	96	96	96	97	97

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TABLE 4

LANGUAGE ARTS SCORE: SRA ASSESSMENT SURVEY NATIONAL GROWTH SCALE VALUES

MEANS

GRD↓ MON→	1	2	3	4	5	6	7	8	9
1	95	101	107	113	119	124	130	136	142
2	147	153	159	165	171	177	183	188	194
3	200	206	212	217	221	226	230	235	239
4	244	248	253	257	260	264	267	271	274
5	278	281	285	288	291	295	298	301	304
6	308	311	314	317	320	322	325	328	331
7	333	336	339	341	344	346	349	351	354
8	356	359	361	363	365	367	369	372	374
9	376	378	380	382	385	387	390	392	395
10	397	400	402	404	406	409	411	413	415
11	418	420	422	424	426	427	429	431	433
12	434	436	438	440	442	443	445	447	449

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STANDARD DEVIATIONS

GRD↓ MON→	1	2	3	4	5	6	7	8	9
1	30	31	32	33	34	36	37	38	39
2	41	42	43	44	45	46	47	49	50
3	51	52	53	53	54	54	54	55	55
4	55	56	56	56	57	57	58	58	59
5	59	60	60	60	61	61	61	62	62
6	62	63	63	63	63	64	64	64	64
7	65	65	65	65	65	65	65	66	66
8	66	66	66	66	66	66	66	67	67
9	67	67	67	67	67	67	67	67	67
10	67	67	67	67	67	67	67	68	68
11	68	68	68	68	68	68	68	68	68
12	68	68	68	68	68	68	68	68	68

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TABLE 5

COMPOSITE SCORE: SRA ASSESSMENT SURVEY NATIONAL GROWTH SCALE VALUES

MEANS

GRD↓ MON→	1	2	3	4	5	6	7	8	9
1	70	78	85	92	100	107	114	122	129
2	136	144	151	158	164	171	178	184	191
3	198	204	211	217	222	228	233	239	244
4	250	255	261	266	271	275	280	285	290
5	294	299	304	309	314	319	324	328	333
6	338	343	348	353	357	362	367	371	376
7	381	385	390	394	398	402	406	410	414
8	418	422	426	430	433	437	440	444	447
9	451	454	458	461	465	468	471	475	478
10	481	485	488	492	495	499	502	506	509
11	513	516	520	522	524	527	529	531	533
12	536	538	540	542	544	547	549	551	553

STANDARD DEVIATIONS

GRD↓ MON→	1	2	3	4	5	6	7	8	9
1	42	43	43	43	44	44	45	45	46
2	46	47	47	47	47	47	47	48	48
3	48	48	48	49	50	50	51	52	53
4	53	54	55	57	58	60	61	63	64
5	66	67	69	70	72	73	75	76	78
6	79	81	82	83	84	85	86	87	88
7	89	90	91	91	92	92	93	93	94
8	94	95	95	95	95	95	95	95	95
9	95	95	95	95	95	95	95	96	96
10	96	96	96	96	97	97	97	98	98
11	98	99	99	99	99	99	99	99	99
12	99	99	99	99	99	99	99	99	99

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TABLE 6

ABBREVIATED TABLE OF SQUARE ROOTS

NUM	SRT	NUM	SRT	NUM	SRT	NUM	SRT	NUM	SRT
2	1.4	45	6.7	114	10.7	215	14.7	348	18.7
3	1.7	46	6.8	116	10.8	218	14.8	352	18.8
4	2.0	47	6.9	118	10.9	221	14.9	356	18.9
5	2.2	49	7.0	120	11.0	224	15.0	360	19.0
6	2.4	50	7.1	123	11.1	227	15.1	363	19.1
7	2.6	52	7.2	125	11.2	230	15.2	367	19.2
8	2.8	53	7.3	127	11.3	233	15.3	371	19.3
9	3.0	55	7.4	129	11.4	236	15.4	375	19.4
10	3.2	56	7.5	132	11.5	239	15.5	379	19.5
11	3.3	58	7.6	134	11.6	242	15.6	383	19.6
12	3.5	59	7.7	136	11.7	245	15.7	387	19.7
13	3.6	61	7.8	139	11.8	249	15.8	391	19.8
14	3.7	62	7.9	141	11.9	252	15.9	395	19.9
15	3.9	64	8.0	143	12.0	255	16.0	399	20.0
16	4.0	65	8.1	146	12.1	258	16.1	403	20.1
17	4.1	67	8.2	148	12.2	261	16.2	407	20.2
18	4.2	69	8.3	151	12.3	265	16.3	411	20.3
19	4.4	70	8.4	153	12.4	268	16.4	415	20.4
20	4.5	72	8.5	156	12.5	271	16.5	419	20.5
21	4.6	74	8.6	158	12.6	274	16.6	423	20.6
22	4.7	75	8.7	161	12.7	278	16.7	427	20.7
23	4.8	77	8.8	163	12.8	281	16.8	431	20.8
24	4.9	79	8.9	166	12.9	284	16.9	435	20.9
25	5.0	81	9.0	168	13.0	288	17.0	439	21.0
26	5.1	82	9.1	171	13.1	291	17.1	444	21.1
27	5.2	84	9.2	173	13.2	295	17.2	448	21.2
28	5.3	86	9.3	176	13.3	298	17.3	452	21.3
29	5.4	88	9.4	179	13.4	302	17.4	456	21.4
30	5.5	90	9.5	181	13.5	305	17.5	461	21.5
31	5.6	92	9.6	184	13.6	309	17.6	465	21.6
32	5.7	94	9.7	187	13.7	312	17.7	469	21.7
34	5.8	96	9.8	190	13.8	316	17.8	474	21.8
35	5.9	98	9.9	192	13.9	319	17.9	478	21.9
36	6.0	100	10.0	195	14.0	323	18.0	482	22.0
37	6.1	102	10.1	198	14.1	326	18.1	487	22.1
38	6.2	104	10.2	201	14.2	330	18.2	491	22.2
40	6.3	106	10.3	204	14.3	334	18.3	496	22.3
41	6.4	108	10.4	206	14.4	337	18.4	500	22.4
42	6.5	110	10.5	209	14.5	341	18.5	505	22.5
43	6.6	112	10.6	212	14.6	345	18.6	509	22.6

TABLE 7

SIGNIFICANCE OF THE CRITICAL RATIO

CRITICAL RATIO	LEVEL OF CONFIDENCE*
LESS THAN -2.58	99 PERCENT
LESS THAN -1.96	95 PERCENT
BETWEEN -1.96 AND +1.96	NOT SIGNIFICANT**
GREATER THAN +1.96	95 PERCENT
GREATER THAN +2.58	99 PERCENT

* THE LEVEL OF CONFIDENCE SHOWS THE PROBABILITY THAT THE DIFFERENCE OBSERVED IS A REAL DIFFERENCE--ONE THAT DID NOT OCCUR BY CHANCE ALONE.

** "NOT SIGNIFICANT" INDICATES THAT THERE IS MORE THAN ONE CHANCE IN TWENTY THAT THE DIFFERENCE COULD OCCUR BY CHANCE, SO THE ACTUAL MEAN AND THE NATIONAL MEAN SHOULD BE CONSIDERED ESSENTIALLY EQUAL.

TABLE 8
ABBREVIATED T-TABLE

DF	CONFIDENCE LEVEL 95%	99%
5	2.57	4.03
6	2.45	3.71
7	2.37	3.50
8	2.31	3.36
9	2.26	3.25
10	2.23	3.17
11	2.20	3.11
12	2.18	3.06
13	2.16	3.01
14	2.15	2.98
15	2.13	2.95
16	2.12	2.92
17	2.11	2.90
18	2.10	2.88
19	2.09	2.86
20	2.09	2.85
21	2.08	2.83
22	2.07	2.82
23	2.07	2.81
24	2.06	2.80
25	2.06	2.79
26	2.06	2.78
27	2.05	2.77
28	2.05	2.76
30	2.04	2.75
31	2.04	2.74
33	2.03	2.73
35	2.03	2.72
38	2 02	2.71
40	2.02	2.70
44	2.02	2.69
45	2.01	2.69
48	2.01	2.68
52	2.01	2.67
55	2.00	2.67
58	2.00	2.66
65	2.00	2.65
70	1.99	2.65
74	1.99	2.64
90	1.99	2.63
100	1.98	2.63
110	1.98	2.62
130	1.98	2.61
170	1.97	2.61
180	1.97	2.60
270	1.97	2.59
520	1.96	2.59
∞	1.96	2.58

TABLE 9

ABBREVIATED CONVERSION TABLE

STANDARD DEVIATIONS FROM MEAN	PERCENTILE CORRESPONDING TO MEAN SCORE	MEAN STANINE	MEAN IQ
+1.0	84	7.0	116
+0.8	79	6.6	113
+0.6	73	6.2	110
+0.4	66	5.8	106
+0.2	58	5.4	103
NATL MEAN	50	5.0	100
-0.1	46	4.8	98
-0.2	42	4.6	97
-0.3	38	4.4	95
-0.4	34	4.2	94
-0.5	31	4.0	92
-0.6	27	3.8	90
-0.7	24	3.6	89
-0.8	21	3.4	87
-0.9	18	3.2	86
-1.0	16	3.0	84
-1.1	14	2.8	82

TABLE 10
READING EXPECTANCY: SRA ASSESSMENT SURVEY NATIONAL GROWTH SCALE VALUES

GRADE	MONTH	+1.0 S.D.	+0.8 S.D.	+0.6 S.D.	+0.4 S.D.	+0.2 S.D.	NATL MEAN	-0.1 S.D.	-0.2 S.D.	-0.3 S.D.	-0.4 S.D.	-0.5 S.D.	-0.6 S.D.	-0.7 S.D.	-0.8 S.D.	-0.9 S.D.	-1.0 S.D.	-1.1 S.D
1	1	145	135	126	117	107	96	93	89	84	79	74	70	65	60	56	51	46
1	2	152	142	133	123	114	104	99	94	90	85	80	75	71	66	61	56	52
1	3	158	148	139	129	120	110	105	100	96	91	85	81	76	72	67	62	57
1	4	164	155	145	135	126	116	111	106	101	97	92	87	82	77	72	68	63
1	5	171	161	151	142	132	122	117	112	107	102	98	[illegible]	85	83	78	73	68
1	6	177	167	158	148	138	128	123	118	113	108	103	98	93	89	84	79	74
1	7	184	174	164	154	144	134	129	124	119	114	109	104	99	94	89	84	79
1	8	190	180	170	160	150	140	135	130	125	120	115	110	105	100	95	90	85
1	9	197	187	176	166	156	146	141	136	131	126	121	116	111	105	100	95	90
2	1	203	193	183	172	162	152	147	142	137	132	126	121	116	111	106	101	96
2	2	210	199	189	179	168	158	153	148	143	137	132	127	122	117	112	106	101
2	3	216	206	195	185	174	164	159	154	148	143	138	133	128	122	117	112	107
2	4	222	212	201	191	180	170	164	159	154	149	143	138	133	128	122	117	112
2	5	228	217	207	195	186	175	170	165	159	154	149	143	138	133	128	122	117
2	6	234	223	213	202	191	181	175	170	165	159	154	149	143	138	133	127	122
2	7	240	229	218	208	197	186	181	175	170	165	159	154	149	143	138	132	127
2	8	246	235	224	213	203	192	186	181	176	170	165	159	154	148	143	138	132
2	9	252	241	230	219	208	197	192	186	181	175	170	165	159	154	148	143	137
3	1	258	247	236	225	214	203	197	192	186	181	175	170	164	159	153	148	142
3	2	264	253	242	231	220	208	203	197	192	186	181	175	170	164	158	153	147
3	3	270	259	248	236	225	214	208	203	197	192	186	180	175	169	164	158	152
3	4	275	264	252	241	230	219	213	207	202	196	190	185	179	173	168	162	156
3	5	280	269	257	246	234	223	217	212	206	200	195	189	183	178	172	166	161
3	6	285	274	262	251	239	228	222	216	210	205	199	193	188	182	176	170	165
3	7	290	278	267	255	244	232	226	221	215	209	203	198	192	186	180	174	169
3	8	295	283	272	260	248	237	231	225	219	213	208	202	196	190	184	179	173
3	9	300	288	277	265	253	241	235	230	224	218	212	206	200	194	189	183	177
4	1	305	293	281	270	258	246	240	234	228	222	216	210	205	199	193	187	181
4	2	310	298	286	274	262	250	244	239	233	227	221	215	209	203	197	191	185
4	3	315	303	291	279	267	255	249	243	237	231	225	219	213	207	201	195	189
4	4	319	307	295	283	271	259	253	247	241	235	229	223	217	211	205	199	193
4	5	323	311	299	287	275	263	257	250	244	238	232	225	220	214	208	202	195
4	6	327	315	303	291	278	266	260	254	248	242	236	230	224	218	212	206	200
4	7	331	319	307	294	282	270	264	258	252	246	240	234	227	221	215	209	203
4	8	335	323	311	298	286	274	268	262	256	249	243	237	231	225	219	213	207
4	9	339	327	314	302	290	278	272	265	259	253	247	241	235	229	222	216	210
5	1	343	331	318	306	294	28[illegible]	275	269	263	257	251	245	238	232	226	220	214
5	2	347	335	322	310	298	285	279	273	267	261	254	248	242	236	230	223	217
5	3	351	339	326	314	301	289	283	277	270	264	258	252	246	239	233	227	221
5	4	354	342	330	317	305	292	286	280	274	268	261	255	249	243	237	230	224
5	5	358	345	333	320	308	296	289	283	277	271	265	258	252	246	240	234	227
5	6	361	349	336	324	311	299	293	287	280	274	268	262	256	249	243	237	231
5	7	364	352	340	327	315	302	296	290	284	278	271	265	259	253	247	240	234
5	8	368	355	343	330	318	306	299	293	287	281	275	269	262	256	250	244	237
5	9	371	359	346	334	321	309	303	297	290	284	278	272	266	259	253	247	241

TABLE 11
MATHEMATICS EXPECTANCY: SRA ASSESSMENT SURVEY NATIONAL GROWTH SCALE VALUES

GRADE	MONTH	+1.0 S.D.	+0.8 S.D.	+0.6 S.D.	+0.4 S.D.	+0.2 S.D.	NATL MEAN	-0.1 S.D.	-0.2 S.D.	-0.3 S.D.	-0.4 S.D.	-0.5 S.D.	-0.6 S.D.	-0.7 S.D.	-0.8 S.D.	-0.9 S.D.	-1.0 S.D.	-1.1 S.D
1	1	141	136	131	126	121	115	113	110	108	105	103	100	98	95	93	90	87
1	2	146	140	135	130	125	120	117	115	112	109	107	104	102	99	97	94	91
1	3	150	145	140	134	129	124	121	119	116	114	111	108	106	103	101	98	95
1	4	154	149	144	139	133	128	126	123	120	118	115	112	110	107	105	102	99
1	5	157	154	148	143	138	132	130	127	125	122	119	117	114	111	109	106	103
1	6	163	158	153	147	142	137	134	131	129	126	123	121	118	115	113	110	107
1	7	168	162	157	152	146	141	138	136	133	130	127	125	122	119	117	114	111
1	8	172	167	161	156	151	145	142	140	137	134	132	129	126	123	121	118	115
1	9	177	171	166	160	155	149	147	144	141	138	136	133	130	127	125	122	119
2	1	181	176	170	165	159	154	151	148	145	143	140	137	134	132	129	126	123
2	2	186	180	174	169	163	158	155	152	149	147	144	141	138	136	133	130	127
2	3	190	184	179	173	168	162	159	156	154	151	148	145	142	140	137	134	131
2	4	196	190	184	178	173	167	164	161	158	155	153	150	147	144	141	138	135
2	5	201	195	190	184	178	172	169	166	163	160	157	154	151	148	145	142	139
2	6	207	201	195	189	183	177	174	171	168	165	162	158	155	152	149	146	143
2	7	213	206	200	194	188	182	178	175	172	169	166	163	160	157	154	150	147
2	8	218	212	206	199	193	186	183	180	177	174	171	167	164	161	158	155	151
2	9	224	217	211	204	198	191	188	185	182	178	175	172	168	165	162	159	155
3	1	230	223	216	210	203	196	193	190	186	183	180	176	173	169	166	163	159
3	2	235	228	222	215	208	201	198	194	191	187	184	181	177	174	170	167	163
3	3	241	234	227	220	213	206	203	199	196	192	189	185	182	178	175	171	168
3	4	247	240	233	226	218	211	208	204	200	197	193	190	186	182	179	175	172
3	5	254	246	239	231	224	216	213	209	205	202	198	194	190	187	183	179	176
3	6	260	252	245	237	229	222	218	214	210	206	203	199	195	191	187	183	180
3	7	266	258	251	243	235	227	223	219	215	211	207	203	199	195	191	187	184
3	8	273	265	256	248	240	232	228	224	220	216	212	208	204	200	196	192	188
3	9	279	271	262	254	246	237	233	229	225	221	217	212	208	204	200	196	192
4	1	285	277	268	260	251	243	238	234	230	225	221	217	213	208	204	200	196
4	2	292	283	274	265	257	248	243	239	235	230	226	221	217	213	208	204	200
4	3	298	289	280	271	262	253	249	244	240	235	231	226	222	217	213	208	204
4	4	303	294	285	276	266	257	253	248	243	239	234	229	225	221	216	211	207
4	5	308	299	290	280	271	261	257	252	247	243	238	233	229	224	219	215	210
4	6	313	304	294	285	275	266	261	256	251	247	242	237	232	228	223	218	213
4	7	318	309	299	289	280	270	265	260	255	250	246	241	236	231	225	221	216
4	8	324	314	304	294	284	274	269	264	259	254	249	244	240	235	230	225	220
4	9	329	319	309	298	288	278	273	268	263	258	253	248	243	238	233	228	223
5	1	334	324	313	303	293	283	277	272	267	262	257	252	247	242	236	231	226
5	2	339	328	318	308	297	287	282	276	271	266	261	256	250	245	240	235	229
5	3	344	333	323	312	302	291	286	280	275	270	265	259	254	249	243	238	233
5	4	349	338	327	317	306	295	290	284	279	273	268	263	257	252	247	241	236
5	5	354	343	332	321	310	299	294	288	283	277	272	266	261	255	250	244	239
5	6	359	348	336	325	314	303	297	292	286	281	275	270	264	258	253	247	242
5	7	364	352	341	330	318	307	301	296	290	284	279	273	267	262	256	250	245
5	8	368	357	345	334	322	311	305	300	294	288	282	277	271	265	259	254	248
5	9	373	362	350	338	327	315	309	303	298	292	286	280	274	268	263	257	251

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TABLE 12
LANGUAGE ARTS PROFICIENCY: SPA ASSESSMENT SURVEY NATIONAL GROWTH SCALE VALUES

GRADE	MONTH	+1.0 S.D.	+0.8 S.D.	+0.6 S.D.	+0.4 S.D.	+0.2 S.D.	MATL MEAN	-0.1 S.D.	-0.2 S.D.	-0.3 S.D.	-0.4 S.D.	-0.5 S.D.	-0.6 S.D.	-0.7 S.D.	-0.8 S.D.	-0.9 S.D.	-1.0 S.D.	-1.1 S.D
1	1	125	119	113	107	101	95	92	90	87	84	81	78	75	72	69	66	63
1	2	132	126	120	114	107	101	98	95	92	89	86	83	80	77	74	70	67
1	3	139	133	126	120	113	107	104	101	97	94	91	88	85	81	78	75	72
1	4	146	139	133	126	119	113	109	106	103	99	96	93	90	86	83	80	76
1	5	153	146	139	132	125	119	115	112	108	105	101	98	94	91	88	84	81
1	6	160	153	146	139	131	124	121	117	114	110	107	103	99	96	92	89	85
1	7	167	160	152	145	137	130	126	123	119	115	112	108	104	101	97	93	90
1	8	174	166	159	151	144	136	132	128	124	121	117	113	109	105	102	98	94
1	9	181	173	165	157	150	142	138	134	130	126	122	118	114	110	105	102	98
2	1	188	180	172	164	156	147	143	139	135	131	127	123	119	115	111	107	103
2	2	195	187	178	170	162	153	149	145	141	137	132	128	124	120	116	111	107
2	3	202	193	185	176	168	159	155	150	146	142	138	133	129	125	120	116	112
2	4	209	200	191	183	174	165	160	156	152	147	143	138	134	130	125	121	116
2	5	216	207	198	189	180	171	166	162	157	153	148	144	139	135	130	126	121
2	6	223	214	204	195	186	177	172	167	163	158	154	149	144	140	135	130	126
2	7	230	221	211	202	192	183	178	173	168	164	159	154	149	145	140	135	130
2	8	237	227	218	208	198	188	184	179	174	169	164	159	154	150	145	140	135
2	9	244	234	224	214	204	194	189	184	179	174	170	165	160	155	150	145	140
3	1	251	241	231	221	210	200	195	190	185	180	175	170	165	160	155	149	144
3	2	258	248	237	227	216	206	201	196	191	185	180	175	170	165	159	154	149
3	3	265	254	244	233	223	212	207	201	196	191	186	180	175	170	164	159	154
3	4	270	259	249	238	227	217	211	206	201	195	190	185	179	174	169	163	158
3	5	275	264	253	243	232	221	216	210	205	200	194	189	184	178	173	167	162
3	6	280	269	258	247	236	226	220	215	209	204	199	193	188	182	177	172	166
3	7	285	274	263	252	241	230	225	219	214	208	203	198	192	187	181	176	170
3	8	289	279	268	257	246	235	229	224	218	213	207	202	197	191	186	180	175
3	9	294	283	272	261	250	239	234	228	223	217	212	206	201	195	190	184	179
4	1	299	288	277	266	255	244	238	233	227	222	216	211	205	200	194	189	183
4	2	304	293	282	271	260	248	243	237	232	226	221	215	209	204	198	193	187
4	3	309	298	287	275	264	253	247	242	236	231	225	219	214	208	203	197	191
4	4	313	302	290	279	268	257	251	245	240	234	228	223	217	211	206	200	194
4	5	317	306	294	283	271	260	254	249	243	237	232	226	220	215	209	203	198
4	6	321	310	298	287	275	264	258	252	246	241	235	229	224	218	212	206	201
4	7	325	313	302	290	279	267	261	255	250	244	238	233	227	221	215	209	204
4	8	329	317	306	294	282	271	265	259	253	247	242	236	230	224	218	213	207
4	9	333	321	310	298	286	274	268	263	257	251	245	239	233	227	222	216	210
5	1	337	325	313	302	290	279	272	266	260	254	248	242	237	231	225	219	213
5	2	341	329	317	305	293	281	275	270	264	258	252	246	240	234	228	222	216
5	3	345	333	321	309	297	285	279	273	267	261	255	249	243	237	231	225	219
5	4	349	336	324	312	300	288	282	276	270	264	258	252	246	240	234	228	222
5	5	352	340	328	316	304	291	285	279	273	267	261	255	249	243	237	231	225
5	6	356	343	331	319	307	295	289	282	276	270	264	258	252	246	240	234	228
5	7	359	347	335	322	310	298	292	286	279	273	267	261	255	249	243	237	230
5	8	363	350	338	326	313	301	295	289	283	276	270	264	258	252	246	239	233
5	9	366	354	342	329	317	304	298	292	286	280	273	267	261	255	249	242	236

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TABLE 13
COMPOSITE SCORE EXPECTANCY: SRA ASSESSMENT SURVEY NATIONAL GROWTH SCALE VALUES

GRADE	MONTH	+1.0 S.D.	+0.8 S.D.	+0.6 S.D.	+0.4 S.D.	+0.2 S.D.	NATL MEAN	-0.1 S.D.	-0.2 S.D.	-0.3 S.D.	-0.4 S.D.	-0.5 S.D.	-0.6 S.D.	-0.7 S.D.	-0.8 S.D.	-0.9 S.D.	-1.0 S.D.	-1.1 S.D
1	1	112	104	96	87	79	70	66	62	58	53	49	45	[illegible]	45	45	45	45
1	2	120	112	103	95	85	78	73	69	65	61	56	52	[illegible]	45	45	45	45
1	3	128	119	111	102	94	85	81	76	72	68	64	59	55	51	46	45	45
1	4	136	127	118	110	101	92	88	84	79	75	71	66	62	58	53	49	45
1	5	144	135	126	117	108	100	95	91	87	82	78	73	69	65	60	56	51
1	6	151	142	134	125	115	107	103	98	94	89	85	80	76	72	67	63	58
1	7	159	150	141	132	123	114	110	105	101	96	92	87	83	79	74	70	65
1	8	167	158	149	140	131	122	117	113	108	104	99	95	90	85	81	76	72
1	9	175	166	156	147	138	129	124	120	115	111	106	102	97	92	88	83	79
2	1	182	173	164	155	146	136	132	127	123	118	113	109	104	99	95	90	86
2	2	190	181	172	162	153	144	139	134	130	125	120	116	111	106	102	97	92
2	3	198	189	179	170	160	151	146	142	137	132	128	123	118	113	109	104	99
2	4	205	195	186	177	167	158	153	148	144	139	134	129	125	120	115	111	106
2	5	212	202	193	183	174	164	160	155	150	145	141	136	131	127	122	117	112
2	6	218	209	199	190	180	171	166	162	157	152	147	143	138	133	128	124	119
2	7	225	216	206	197	187	178	173	168	163	159	154	149	144	140	135	130	125
2	8	232	222	213	203	194	184	180	175	170	165	161	156	151	146	142	137	132
2	9	239	229	220	210	201	191	186	181	177	172	167	162	158	153	148	143	139
3	1	245	236	226	217	207	198	193	188	183	179	174	169	164	159	155	150	145
3	2	252	243	233	223	214	204	200	195	190	185	180	176	171	166	161	156	152
3	3	259	249	240	230	221	211	206	201	197	192	187	182	177	173	168	163	158
3	4	265	256	246	236	226	217	212	207	202	197	192	187	182	178	173	168	163
3	5	272	262	252	242	232	222	217	212	207	202	197	192	187	182	178	173	168
3	6	278	268	258	248	238	228	223	218	213	208	203	197	192	187	182	177	172
3	7	284	274	264	254	243	233	228	223	218	213	208	203	197	192	187	182	177
3	8	291	280	270	260	249	239	234	228	223	218	213	208	202	197	192	187	182
3	9	297	286	276	265	255	244	239	234	229	223	218	213	207	202	197	192	186
4	1	303	293	282	271	261	250	245	239	234	229	223	218	212	207	202	196	191
4	2	310	299	288	277	266	255	250	245	239	234	228	223	217	212	207	201	196
4	3	316	305	294	283	272	261	256	250	245	239	234	228	223	217	212	206	201
4	4	322	311	300	288	277	266	260	254	249	243	238	232	226	221	215	209	204
4	5	329	317	305	294	282	271	265	259	253	247	242	236	230	224	218	212	207
4	6	335	323	311	299	287	275	269	263	257	251	246	240	234	228	222	216	210
4	7	341	329	317	305	292	280	274	268	262	256	250	243	237	231	225	219	213
4	8	348	335	323	310	297	285	279	272	266	260	254	247	241	235	228	222	216
4	9	354	341	328	315	303	290	283	277	270	264	258	251	245	238	232	225	219
5	1	360	347	334	321	308	294	288	281	275	268	[illegible]	255	249	242	235	229	222
5	2	367	353	340	326	313	299	292	286	279	[illegible]	266	259	252	245	239	232	225
5	3	373	359	345	332	318	304	297	290	283	276	270	263	256	249	242	235	228
5	4	379	365	351	337	323	309	302	295	288	281	274	267	260	253	245	238	231
5	5	386	371	357	343	328	314	307	299	292	285	278	271	263	256	249	242	235
5	6	392	377	363	348	333	319	311	304	297	289	282	275	267	260	253	245	238
5	7	398	383	368	353	339	324	316	309	301	294	286	279	271	264	256	249	241
5	8	405	389	374	359	344	328	321	313	306	298	290	283	275	267	260	252	245
5	9	411	395	380	364	349	333	326	318	310	302	295	287	279	271	263	256	248

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TABLE 14
READING EXPECTANCY: GENERALIZED GRADE EQUIVALENTS BASED ON SRA READING GROWTH SCALES

GRADE	MONTH	+1.0 S.D.	+0.8 S.D.	+0.6 S.D.	+0.4 S.D.	+0.2 S.D.	RATL MEAN	-0.1 S.D.	-0.2 S.D.	-0.3 S.D.	-0.4 S.D.	-0.5 S.D.	-0.6 S.D.	-0.7 S.D.	-0.8 S.D.	-0.9 S.D.	-1.0 S.D.	-1.1 S.D
1	1	1-9	1-7	1-6	1-4	1-3	1-1	1-1	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0
1	2	2-1	1-8	1-7	1-5	1-4	1-2	1-1	1-1	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0
1	3	2-2	1-9	1-8	1-6	1-5	1-3	1-2	1-1	1-1	1-1	1-0	1-0	1-0	1-0	1-0	1-0	1-0
1	4	2-3	2-2	1-9	1-7	1-6	1-4	1-3	1-2	1-2	1-1	1-1	1-0	1-0	1-0	1-0	1-0	1-0
1	5	2-4	2-3	2-1	1-8	1-7	1-5	1-4	1-3	1-3	1-2	1-1	1-1	1-0	1-0	1-0	1-0	1-0
1	6	2-5	2-4	2-2	1-9	1-8	1-6	1-5	1-4	1-4	1-3	1-2	1-1	1-1	1-0	1-0	1-0	1-0
1	7	2-7	2-5	2-3	2-1	1-9	1-7	1-6	1-5	1-5	1-4	1-3	1-2	1-1	1-1	1-0	1-0	1-0
1	8	2-8	2-6	2-4	2-2	2-1	1-9	1-7	1-6	1-6	1-5	1-4	1-3	1-2	1-1	1-1	1-0	1-0
1	9	2-9	2-7	2-5	2-3	2-2	1-9	1-8	1-7	1-7	1-6	1-5	1-4	1-3	1-2	1-1	1-1	1-0
2	1	3-1	2-8	2-6	2-4	2-3	2-1	1-9	1-8	1-8	1-7	1-6	1-5	1-4	1-3	1-2	1-2	1-1
2	2	3-2	2-9	2-8	2-6	2-4	2-2	2-1	1-9	1-9	1-8	1-7	1-6	1-5	1-4	1-3	1-2	1-2
2	3	3-3	3-2	2-9	2-7	2-5	2-3	2-2	2-1	1-9	1-9	1-8	1-7	1-6	1-5	1-4	1-3	1-3
2	4	3-5	3-3	3-1	2-8	2-6	2-4	2-3	2-2	2-1	2-1	1-9	1-8	1-7	1-6	1-5	1-4	1-3
2	5	3-6	3-4	3-2	2-9	2-7	2-5	2-4	2-3	2-2	2-1	2-1	1-9	1-8	1-7	1-6	1-5	1-4
2	6	3-7	3-5	3-3	3-1	2-8	2-6	2-5	2-4	2-3	2-2	2-1	2-1	1-9	1-8	1-7	1-6	1-5
2	7	3-9	3-5	3-4	3-2	2-9	2-7	2-6	2-5	2-4	2-3	2-2	2-1	2-1	1-9	1-8	1-7	1-6
2	8	4-1	3-8	3-5	3-3	3-1	2-8	2-7	2-6	2-5	2-4	2-3	2-2	2-1	1-9	1-9	1-8	1-7
2	9	4-2	3-9	3-7	3-4	3-2	2-9	2-8	2-7	2-6	2-5	2-4	2-3	2-2	2-1	1-9	1-9	1-8
3	1	4-4	4-1	3-8	3-5	3-3	3-1	2-9	2-8	2-7	2-6	2-5	2-4	2-3	2-2	2-1	1-9	1-8
3	2	4-5	4-3	3-9	3-7	3-4	3-2	3-1	2-9	2-8	2-7	2-6	2-5	2-4	2-3	2-2	2-1	1-9
3	3	4-7	4-4	4-2	3-8	3-5	3-3	3-2	3-1	2-9	2-8	2-7	2-6	2-5	2-4	2-3	2-2	2-1
3	4	4-8	4-5	4-2	3-9	3-7	3-4	3-3	3-2	3-1	2-9	2-8	2-7	2-6	2-5	2-4	2-3	2-2
3	5	5-1	4-7	4-4	4-1	3-7	3-5	3-4	3-3	3-2	3-1	2-9	2-8	2-6	2-6	2-4	2-3	2-3
3	6	5-2	4-8	4-5	4-2	3-9	3-6	3-5	3-3	3-2	3-1	2-9	2-8	2-7	2-6	2-5	2-4	2-3
3	7	5-3	4-9	4-6	4-3	4-1	3-7	3-6	3-5	3-3	3-2	3-1	2-9	2-8	2-7	2-6	2-5	2-4
3	8	5-5	5-2	4-8	4-4	4-2	3-8	3-7	3-5	3-4	3-3	3-2	3-1	2-9	2-8	2-7	2-6	2-5
3	9	5-6	5-3	4-9	4-6	4-3	3-9	3-8	3-7	3-5	3-4	3-3	3-2	3-1	2-8	2-8	2-6	2-5
4	1	5-8	5-4	5-1	4-7	4-4	4-1	3-9	3-7	3-6	3-5	3-3	3-2	3-1	2-9	2-8	2-7	2-6
4	2	5-9	5-6	5-2	4-8	4-5	4-2	4-1	3-9	3-7	3-6	3-5	3-3	3-2	3-1	2-9	2-8	2-7
4	3	6-2	5-7	5-4	4-9	4-6	4-3	4-2	3-9	3-8	3-7	3-5	3-4	3-3	3-2	3-1	2-9	2-8
4	4	6-3	5-8	5-5	5-2	4-7	4-4	4-3	4-1	3-9	3-8	3-6	3-5	3-4	3-3	3-1	2-9	2-8
4	5	6-4	6-1	5-6	5-3	4-8	4-5	4-4	4-2	4-1	3-8	3-7	3-6	3-4	3-3	3-2	3-1	2-9
4	6	6-6	6-2	5-7	5-4	4-9	4-6	4-4	4-3	4-2	3-9	3-8	3-7	3-5	3-4	3-3	3-2	3-1
4	7	6-7	6-3	5-8	5-5	5-1	4-7	4-5	4-4	4-2	4-1	3-9	3-7	3-6	3-5	3-3	3-2	3-1
4	8	6-9	6-4	6-1	5-6	5-2	4-8	4-7	4-5	4-3	4-2	3-9	3-8	3-7	3-5	3-4	3-3	3-2
4	9	7-1	6-6	6-2	5-7	5-3	4-9	4-8	4-6	4-4	4-3	4-1	3-9	3-8	3-6	3-5	3-3	3-2
5	1	7-3	6-7	6-3	5-8	5-5	5-1	4-8	4-7	4-5	4-4	4-2	4-1	3-8	3-7	3-6	3-4	3-3
5	2	7-4	6-9	6-4	5-9	5-6	5-2	4-9	4-8	4-6	4-5	4-3	4-2	3-9	3-8	3-7	3-5	3-4
5	3	7-6	7-1	6-6	6-2	5-7	5-3	5-2	4-9	4-7	4-5	4-4	4-2	4-1	3-9	3-7	3-6	3-5
5	4	7-7	7-2	6-7	6-2	5-8	5-4	5-2	5-1	4-8	4-7	4-5	4-3	4-2	3-9	3-8	3-7	3-5
5	5	7-9	7-4	6-8	6-3	5-9	5-5	5-3	5-2	4-9	4-7	4-6	4-4	4-2	4-1	3-9	3-7	3-6
5	6	8-1	7-5	6-9	6-5	6-1	5-6	5-4	5-3	5-1	4-8	4-7	4-5	4-3	4-2	3-9	3-8	3-7
5	7	8-2	7-6	7-2	6-6	6-2	5-7	5-5	5-3	5-2	4-9	4-7	4-6	4-4	4-3	4-1	3-9	3-7
5	8	8-4	7-8	7-3	6-7	6-3	5-8	5-5	5-4	5-3	5-1	4-8	4-7	4-5	4-3	4-2	4-1	3-8
5	9	8-6	7-9	7-4	6-8	6-4	5-9	5-7	5-5	5-3	5-2	4-9	4-8	4-6	4-4	4-3	4-1	3-9

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TABLE 15
MATHEMATICS EXPECTANCY: GENERALIZED GRADE EQUIVALENTS BASED ON SRA MATHEMATICS GROWTH SCALES

GRADE	MONTH	+1.0 S.D.	+0.8 S.D.	+0.6 S.D.	+0.4 S.D.	+0.2 S.D.	MATL MEAN	-0.1 S.D.	-0.2 S.D.	-0.3 S.D.	-0.4 S.D.	-0.5 S.D.	-0.6 S.D.	-0.7 S.D.	-0.8 S.D.	-0.9 S.D.	-1.0 S.D.	-1.1 S.D
1	1	1-7	1-6	1-5	1-4	1-2	1-1	1-1	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0
1	2	1-8	1-7	1-6	1-5	1-3	1-2	1-1	1-1	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0
1	3	1-9	1-8	1-7	1-5	1-4	1-3	1-2	1-2	1-1	1-1	1-0	1-0	1-0	1-0	1-0	1-0	1-0
1	4	2-1	1-9	1-8	1-7	1-5	1-4	1-4	1-3	1-2	1-2	1-1	1-0	1-0	1-0	1-0	1-0	1-0
1	5	2-2	2-1	1-9	1-8	1-6	1-5	1-5	1-4	1-3	1-3	1-2	1-1	1-1	1-0	1-0	1-0	1-0
1	6	2-3	2-2	2-1	1-9	1-7	1-6	1-5	1-5	1-4	1-4	1-3	1-2	1-2	1-1	1-1	1-0	1-0
1	7	2-4	2-3	2-2	2-1	1-8	1-7	1-6	1-6	1-5	1-5	1-4	1-3	1-3	1-2	1-1	1-1	1-0
1	8	2-5	2-4	2-3	2-2	1-9	1-8	1-7	1-7	1-6	1-5	1-5	1-4	1-4	1-3	1-2	1-2	1-1
1	9	2-6	2-5	2-4	2-3	2-1	1-9	1-9	1-8	1-7	1-6	1-6	1-5	1-5	1-4	1-3	1-3	1-2
2	1	2-7	2-6	2-5	2-4	2-2	2-1	1-9	1-9	1-8	1-8	1-7	1-6	1-5	1-5	1-4	1-4	1-3
2	2	2-8	2-7	2-5	2-4	2-3	2-2	2-1	2-1	1-9	1-9	1-8	1-7	1-6	1-6	1-5	1-5	1-4
2	3	2-9	2-8	2-6	2-5	2-4	2-3	2-2	2-2	2-1	1-9	1-9	1-8	1-7	1-7	1-6	1-5	1-5
2	4	3-1	2-9	2-8	2-6	2-5	2-4	2-3	2-3	2-2	2-1	2-1	1-9	1-9	1-8	1-7	1-6	1-6
2	5	3-2	3-1	2-9	2-8	2-6	2-5	2-4	2-4	2-3	2-3	2-2	2-1	1-9	1-9	1-8	1-7	1-7
2	6	3-3	3-2	3-1	2-9	2-7	2-6	2-5	2-5	2-4	2-4	2-3	2-2	2-1	2-1	1-9	1-8	1-8
2	7	3-4	3-3	3-2	3-1	2-8	2-7	2-6	2-6	2-5	2-4	2-4	2-3	2-3	2-2	2-1	1-9	1-9
2	8	3-5	3-4	3-3	3-2	2-9	2-8	2-7	2-7	2-6	2-5	2-5	2-4	2-3	2-3	2-2	2-1	1-9
2	9	3-6	3-5	3-4	3-3	3-1	2-9	2-8	2-8	2-7	2-6	2-6	2-5	2-4	2-4	2-3	2-2	2-1
3	1	3-8	3-6	3-5	3-4	3-2	3-1	2-9	2-9	2-8	2-7	2-7	2-6	2-5	2-4	2-4	2-3	2-2
3	2	3-9	3-7	3-6	3-5	3-3	3-2	3-1	3-1	2-9	2-8	2-8	2-7	2-6	2-5	2-5	2-4	2-3
3	3	4-1	3-8	3-7	3-6	3-4	3-3	3-2	3-2	3-1	2-9	2-9	2-8	2-7	2-6	2-6	2-5	2-4
3	4	4-2	4-1	3-8	3-7	3-5	3-4	3-3	3-3	3-2	3-1	2-9	2-9	2-8	2-7	2-6	2-6	2-5
3	5	4-3	4-2	3-9	3-8	3-6	3-5	3-4	3-4	3-3	3-2	3-1	3-1	2-9	2-8	2-7	2-6	2-6
3	6	4-5	4-3	4-1	3-9	3-7	3-6	3-5	3-5	3-4	3-3	3-2	3-2	3-1	2-9	2-8	2-7	2-7
3	7	4-6	4-4	4-3	4-1	3-9	3-7	3-6	3-6	3-5	3-4	3-3	3-2	3-2	3-1	2-9	2-8	2-8
3	8	4-8	4-6	4-4	4-2	4-1	3-8	3-7	3-6	3-6	3-5	3-4	3-3	3-3	3-2	3-1	2-9	2-8
3	9	4-9	4-7	4-5	4-3	4-2	3-9	3-8	3-7	3-7	3-6	3-5	3-4	3-3	3-3	3-2	3-1	2-9
4	1	5-2	4-9	4-7	4-5	4-3	4-1	3-9	3-8	3-8	3-7	3-6	3-5	3-4	3-3	3-3	3-2	3-1
4	2	5-3	5-1	4-8	4-6	4-4	4-2	4-1	3-9	3-9	3-8	3-7	3-6	3-5	3-4	3-3	3-3	3-2
4	3	5-5	5-3	4-9	4-7	4-5	4-3	4-2	4-1	4-1	3-9	3-8	3-7	3-6	3-5	3-4	3-3	3-3
4	4	5-6	5-4	5-2	4-9	4-6	4-4	4-3	4-2	4-1	3-9	3-8	3-8	3-7	3-6	3-5	3-4	3-3
4	5	5-7	5-5	5-3	4-9	4-7	4-5	4-4	4-3	4-2	4-1	3-9	3-8	3-7	3-6	3-6	3-5	3-4
4	6	5-9	5-6	5-4	5-1	4-8	4-6	4-5	4-4	4-3	4-2	4-1	3-9	3-8	3-7	3-6	3-5	3-4
4	7	6-1	5-8	5-5	5-3	4-9	4-7	4-6	4-5	4-4	4-2	4-2	4-1	3-9	3-8	3-7	3-6	3-5
4	8	6-2	5-9	5-6	5-4	5-1	4-8	4-7	4-6	4-5	4-3	4-2	4-1	4-1	3-9	3-8	3-6	3-6
4	9	6-4	6-1	5-8	5-5	5-2	4-9	4-8	4-7	4-5	4-4	4-3	4-2	4-1	3-9	3-8	3-7	3-6
5	1	6-5	6-2	5-9	5-6	5-4	5-1	4-9	4-8	4-6	4-5	4-5	4-3	4-2	4-1	3-9	3-8	3-7
5	2	6-8	6-3	6-1	5-7	5-5	5-2	5-1	4-9	4-7	4-6	4-5	4-4	4-2	4-1	4-1	3-9	3-7
5	3	6-8	6-5	6-2	5-8	5-6	5-3	5-2	4-9	4-8	4-7	4-6	4-5	4-3	4-1	4-1	3-9	3-8
5	4	6-9	6-6	6-3	6-1	5-7	5-4	5-3	5-1	4-9	4-8	4-7	4-5	4-4	4-1	4-2	4-1	3-9
5	5	7-1	6-7	6-4	6-2	5-8	5-5	5-4	5-2	5-1	4-9	4-8	4-6	4-5	4-1	4-2	4-1	3-9
5	6	7-3	6-9	6-5	6-3	5-9	5-6	5-5	5-3	5-2	5-1	4-8	4-7	4-6	4-1	4-3	4-2	4-1
5	7	7-4	7-1	6-7	6-4	6-1	5-7	5-6	5-4	5-3	5-1	4-9	4-8	4-6	4-3	4-4	4-2	4-1
5	8	7-5	7-2	6-8	6-5	6-2	5-8	5-7	5-5	5-4	5-2	5-1	4-9	4-7	4-6	4-5	4-3	4-2
5	9	7-7	7-3	6-9	6-6	6-3	5-9	5-8	5-6	5-5	5-3	5-2	4-9	4-8	4-7	4-5	4-4	4-3

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TABLE 16
ABBREVIATED F-TABLE

DF 1:N	CONFIDENCE LEVEL 950/0	990/0	DF 1:N	CONFIDENCE LEVEL 950/0	990/0
5	6.61	16.24	53	4.02	7.14
6	5.99	13.74	54	4.02	7.13
7	5.59	12.25	55	4.02	7.12
8	5.32	11.26	56	4.01	7.11
9	5.12	10.57	57	4.01	7.10
10	4.97	10.05	59	4.01	7.09
11	4.85	9.65	60	4.00	7.08
12	4.75	9.33	61	4.00	7.07
13	4.67	9.08	62	4.00	7.06
14	4.60	8.87	64	3.99	7.05
15	4.55	8.69	65	3.99	7.04
16	4.50	8.53	67	3.99	7.03
17	4.45	8.40	68	3.98	7.03
18	4.42	8.29	69	3.98	7.02
19	4.38	8.19	70	3.98	7.01
20	4.35	8.10	72	3.98	7.00
21	4.33	8.02	73	3.97	7.00
22	4.30	7.95	74	3.97	6.99
23	4.28	7.88	76	3.97	6.98
24	4.26	7.83	78	3.97	6.97
25	4.24	7.77	79	3.96	6.97
26	4.23	7.72	80	3.96	6.96
27	4.21	7.68	90	3.95	6.93
28	4.20	7.64	100	3.94	6.90
29	4.18	7.60	110	3.93	6.87
30	4.17	7.57	120	3.92	6.85
31	4.16	7.53	130	3.92	6.84
32	4.15	7.50	140	3.91	6.82
33	4.14	7.47	150	3.91	6.81
34	4.13	7.45	160	3.90	6.80
35	4.12	7.42	170	3.90	6.79
36	4.12	7.40	180	3.90	6.78
37	4.11	7.38	190	3.89	6.77
38	4.10	7.36	210	3.89	6.76
39	4.09	7.34	220	3.89	6.75
40	4.09	7.32	230	3.88	6.75
41	4.08	7.30	240	3.88	6.74
42	4.07	7.28	270	3.88	6.73
43	4.07	7.27	300	3.87	6.72
44	4.06	7.25	330	3.87	6.71
45	4.06	7.24	380	3.87	6.70
46	4.05	7.22	430	3.86	6.70
47	4.05	7.21	440	3.86	6.69
48	4.04	7.20	540	3.86	6.68
49	4.04	7.18	670	3.86	6.67
50	4.04	7.17	790	3.85	6.67
51	4.03	7.16	910	3.85	6.66
52	4.03	7.15	oo	3.84	6.64

Level IV. EFFECTS ON LEARNERS

Part C. Sequential Analysis as a Means of Evaluating Pupil Performance

SEQUENTIAL ANALYSIS AS A MEANS OF EVALUATING PUPIL PERFORMANCE

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The material to be presented in this section of the SOURCEBOOK is speculative in nature. It presents a design for using Sequential Analysis as a means of evaluating changes in pupil performance associated with the application of specific instructional materials. While the use of Sequential Analysis has been used in a wide variety of instructional situations for evaluating student performance, it has never been used for evaluating student performance associated with the use of instructional materials for the purpose of materials evaluation. Studies conducted to date indicate clearly that the application to be discussed below has considerable potential as one means of evaluating instructional materials.

The technique of Sequential Analysis in all probability has its greatest potential as a quality control system for education. Its potential lies in the fact that the teacher can quantify the outcomes of instruction in such a way that minimal and maximal performance levels can be defined objectively. A simple plotting system permits the teacher to determine rapidly and objectively if instruction is achieving or not achieving its goals. Sequential Analysis has been used by the senior author to evaluate instructional outcomes in a class for severely emotionally disturbed children, speech therapy, in classes for the educable retarded in an experimental teacher training program, remedial reading programs, a learning disability clinic, and several regular class settings. In all situations the procedure is the evaluation mechanism used in a large percentage of the Development Centers for the Handicapped in California. Reports on a number of these applications are being prepared for publication.

The Proposed Materials Evaluation Model

The application of a posteriori statistical inference (sequential analysis) to material evaluation in terms of student performance is similar to that discussed in the section of the SOURCEBOOK dealing with teacher opinion summarization. The material is evaluated in terms

of whether or not pupils achieve the behavior objectives specified by the material's manufacturer.

Before discussing the application of sequential analysis to materials evaluation, it is important to review its application to evaluating pupil performance. While the statistical assumptions and basic procedures are similar to those described in the Summarization of Teacher Opinion section (see Nelson and Grenda, Level II, Part C, pp. 243-254), there are certain differences.

Assumptions

There are four assumptions underlying the application of sequential analysis to the evaluation of instructional outcomes. No claim is being made that these assumptions constitute the only logic which could be developed to underlie the application of a posteriori statistical inference to evaluating instruction. They do, however, constitute the logic for the applications which have been made by the senior author to date.

The first assumption is that the outcomes of instruction should be evaluated in terms of performance (not performance change or learning). Further, simply observing performance is not sufficient. Performance ought to be measurable in such a [illegible] that the teacher is able to predict that under certain circumstances (namely, those similar to the instructional situation) that the pupil will perform at a comparable level in the future. In general, the best single predictor of future performance is past performance in similar situations. Sequential analysis provides a means for making such predictions.

If the above assumption is accepted, then the procedure being advanced cannot be used to evaluate the outcomes of any instructional process unless those outcomes can be specified in behavior terms. Products of instruction which are inferred (e.g., improved self image, self confidence, feelings of worth, etc.) cannot be evaluated unless the behaviors on which the inferences are based have been described.

The second assumption is that in the absence of any information about the pupil, it is no more likely that any specific behavior will be observed than any other. As one observes the pupil and acquires information about him, he is able to infer that some behaviors are more likely than others. When instruction is started, the behavioral outcomes of instruction specified by the teacher are assumed to have a less likelihood of being observed than other behaviors, or a likelihood of being observed less than the teacher would prefer, or there would be no reason for teaching. Instruction then starts with the identification of low probability behaviors which are regarded as important in the curriculum.

It might be objected that simply because a teacher does not observe a behavior that it has a low likelihood of being observed. This might certainly be true. However, if a teacher has selected such a behavior (that is, one which is thought to have a low probability of occurring and in fact has a high probability of being observed), this will almost immediately be determined when the evaluation system is applied.

The third assumption is that if instruction is doing anything at all, it is changing the probabilities of behaviors being observed. These probabilities may increase or decrease depending upon the teacher's goals and the instructional process itself. In most instructional situations, the teacher is interested in increasing the probability that behaviors will be observed. The application of methods and materials is for the purpose of increasing behavior probabilities.

According to assumption three, each time the teacher "instructs" (implements a classroom procedure), one of three things can happen. The behavior can become more likely. The behavior can become less likely. The behavior's likelihood of being observed does not change. The use of sequential analysis permits one to make a judgment that a specific probability level has been achieved. If instruction is effective, and if the objective of instruction is to achieve a particular likelihood of performance demonstration, then successive exposures to instruction will result in successive changes in behavior probabilities until criterion is reached.

The fourth assumption is a pragmatic one. It is assumed that, when evaluating instructional outcomes, we are not concerned with WHY the application of certain methods or materials are associated with specific performance of the pupil. This is a matter for other studies since it deals with a different situation. The question we are interested in is simply, "Is the employment of certain instructional processes associated with observed performance outcomes?" Why this happens is not at issue. If the application of a specific instructional procedure does not result in achieving prespecified performance criteria, then it is necessary to review that procedure and make modifications when indicated.

Evaluating Instruction

Before commencing instruction, the teacher must make several preliminary decisions. Using curriculum rationale, it is first necessary to determine the performance outcomes which instruction is supposed to produce. Second, the teacher must decide what methods and materials will be introduced to achieve the performance objective. Third, it is necessary to determine the performance probability which

will be a satisfactory indication that the objective of instruction has been reached. Fourth, the teacher needs to establish a performance probability which constitutes a minimum level for justifying the continuance of the instructional process. This last feature provides a means of supplying data to the effect that the methods-materials plan is probably not going to produce the performance levels desired. It thus is an indicator that the teacher should recycle the process making appropriate modifications. The manner in which the teacher makes these decisions is not a matter to be discussed in this paper. It is sufficient, for our purposes, to point out that they should be made before instruction starts.

Once the teacher has made the preliminary decisions, the instructional plan can be implemented and its outcomes can be evaluated. Intervention procedures must be designed so that they can be introduced enough times with a number of pupils so that performance can be demonstrated often enough to justify a posteriori predictive statements. Another consideration is that all statements about performance outcomes must be in such a form that they are evaluatable as demonstrated or not demonstrated.

Performance criteria are stated in terms of the proportion of times pupils demonstrate the performance objectives compared with the total number of opportunities to do so. Thus, sequential analysis of proportions is the statistical treatment on which the evaluation is made. In the studies conducted thus far, criteria such as students will perform "x" 80% of the time have been used for deciding that the outcomes are positive. The alternative criterion statement is that the pupil will perform the specified behavior 50% of the time. While these criteria are arbitrary, they have proved useful in all studies thus far. One reason for their utility is that they constitute minimums and maximums. That is, in order to reach the 80% criterion most pupils are actually performing at a higher level than 80%, and in order to achieve the 50% criterion level they are performing below the level specified.

A special Matrix for plotting pupil responses is available (Nelson and Schmidt, 1972). This matrix contains the criterion lines representing four pairs of minimum and maximum decision criteria. The lines representing the criteria are mathematically derived (see Nelson and Grenda, Level II, Part C, pp. 243-254). In addition to representing the various long-range performance proportions, they represent the risks the teacher is accepting when either a positive or negative decision is made. These are .01 and .05 respectively. Figure 1 presents a Matrix on which plots leading to positive and negative decisions are illustrated.

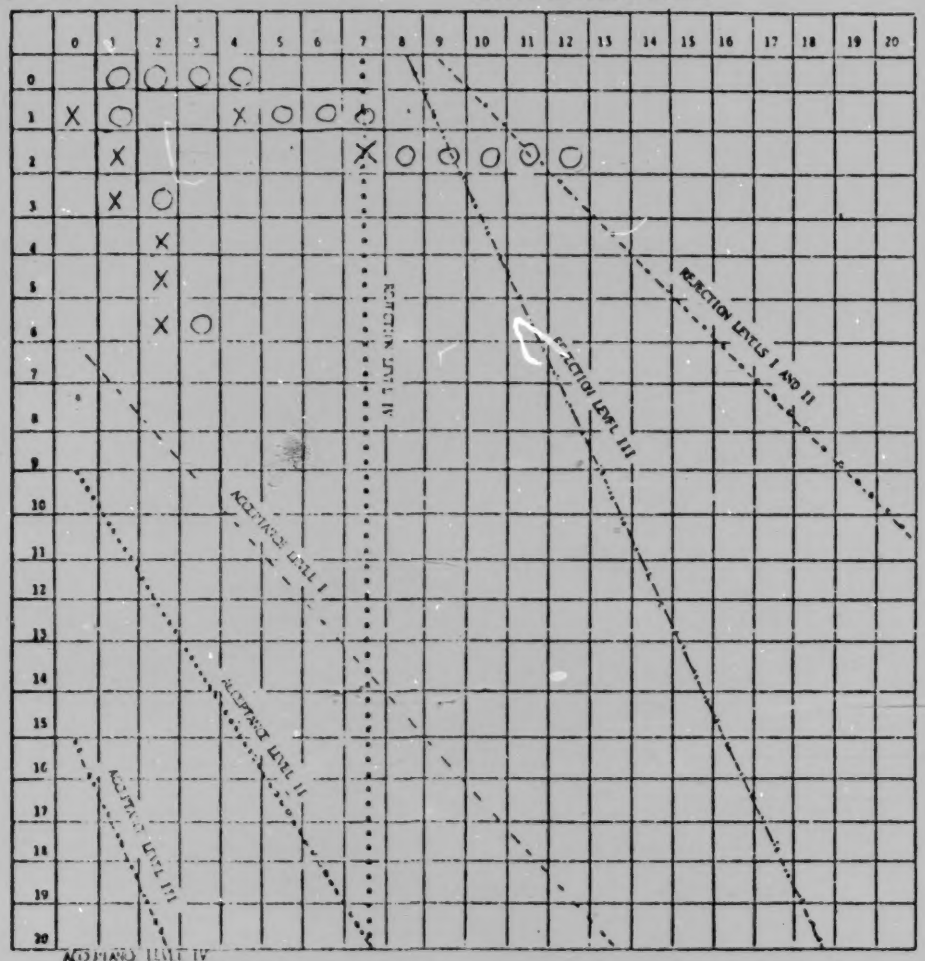
TEST _____ BEHAVIORAL OBJECTIVE _____

SUBJECT _____ DATE _____

INSTRUCTIONAL DECISION MATRIX AND PERFORMANCE RECORD

SEQUENCE NUMBER

NUMBER OF ACCUMULATIVE FAILURES



ACCEPTANCE LEVEL IV
Requires 30 continuous successes

PROCEDURE

1. Instructor must select performance criterion prior to initiating teaching. Refer to Performance Criterion Sheet
2. Commence Teaching
3. Record Instructional outcomes as follows:
   a. Initiate recording in upper left hand corner of Matrix
   b. Progress recording to the right and/or down on Matrix
   c. Each successful student response is recorded by placing an X in its appropriate box (see example)
   d. Each unsuccessful student response is recorded by placing a O in its appropriate box (see example)

   NOTE: For successful responses move progressively downward--for unsuccessful responses move progressively to the right

4. When a O crosses the instructors preselected criterion line (see Step 1) instruction stops. The teacher may be sure that the behavior objective was not achieved at criterion level.
5. When an X crosses the instructors preselected criterion line (see Step 1) instruction stops. The teacher has demonstrated that the behavior objective was achieved at the criterion level selected.

Figure 1.

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All a teacher need do is teach, observe the outcomes and plot whether the performance objective was or was not demonstrated. When the plot crosses a predetermined decision line, instruction is stopped. If the positive line was crossed, then the teacher can move on to the next objective. If the negative line was crossed, then the teacher should review the instructional process, make the appropriate adjustments and begin to teach again.

While the discussion to this point has been presented in terms of one teacher working with one student, it need not be restricted to tutorial situations.[1] The method has been effectively used with groups such as an entire classroom. Adaptations are simple and involve mostly the restatement of criteria.

While the above discussion essentially describes the use of sequential analysis for evaluating instruction, there is an additional feature. By computing the Average Sample Number curve for a given criterion level, it is possible to develop a profile chart which permits the teacher to determine the actual performance level achieved when a decision is made. It will be recalled that reaching the 80% of the time level simply indicates a minimum performance level. The performance level demonstrated is regarded as a parameter value (that is, the likelihood to be demonstrated in the long run).

The Average Sample Number curve shows the number of trials (on the average) which will be required if the true likelihood of the proportion is a certain amount. Thus, if the Average Sample Number for P = .80 is 15, and if the criterion was achieved in 9 trials, then the performance parameter value is much higher than P = .80. In this case, it is 1.0 or certainty. If 36 trials were required, the parameter value would have been P = .70. These trial values are, of course, different for different sets of proportions described in the several criteria which can be used.

The various trial values can be assembled on a profile sheet. The teacher merely finds the number of trials required to achieve criteria on the top of the profile sheet and reads the true performance proportions from the bottom. The profile permits the listing of 20 behavioral objectives. If the trials required to achieve criterion for each of the objectives are plotted, then a graphic method of comparing performance outcomes is available.

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[1] When the procedures are used with a single pupil, the independence assumption required in sequential analysis cannot typically be met (i.e., how a student responds over time cannot be assumed independent). Therefore, modifications in the mathematical equations used to estimate acceptance and rejection probabilities must change to account for dependencies.

Evaluating Instructional Materials

It is proposed that one way of evaluating instructional materials is to apply sequential analysis to pupil performance evaluation as described above. All that need be done is to inject the materials being evaluated into the instructional situation. Such an injection would, of course, be in terms of the manufacturer's recommendations. If positive performance criteria are reached, and if this result occurs consistently in different instructional situations, then it can be concluded that the material is a useful element in instructional situations.

In a sense, the proposed model is not unlike the kind of product evaluations conducted by consumers' testing organizations. The product is purchased by the testing group and subjected to a variety of test situations. Performance is evaluated in terms of whether the item functions as advertised, how well it functions, how durable it is, etc.

For testing materials, it is proposed that teachers be selected as the evaluators. The teachers are supplied with the materials to be evaluated and are asked to use the materials as specified by the manufacturer. Pupil performance is evaluated by the application of sequential analysis described above.

It goes without saying that an important element of this evaluation procedure is assuring that the pupil does not already consistently perform the behavior objectives which are specified for an instructional material. The teacher-evaluator must, before using the material, conduct an assessment of the child's entry behaviors.

The number of teacher-evaluators and the number of pupils on whom the materials are to be used is open. Decisions about the number of test cases is a function of the ambitiousness of the evaluation plan, the kinds of materials being evaluated, the objectives which the materials were designed to produce, and the kinds of generalizations which the evaluators wish to make. Obviously, the extent of evaluation is related to resources available.

If one is interested in usefulness of material "x" for achieving behavioral objective "y" when working with mentally retarded children, and if one were interested in educably retarded children in a specific geographic area, representative samples of retarded children and their teachers in that geographic area would be selected. The teachers would be supplied with the materials and requested to introduce them as specified in the instructions for using the materials. Each participant teacher would be requested to use the same performance criterion for each objective and to plot behavior outcomes in accordance with the sequential analysis model described above. Actual performance outcomes would be compared with those predicted from the average sample number curve for the criterion level being used. Evaluation would be made in terms

of deviations from predicted average sample number values.

It might be argued that this evaluation model does not permit one to state that a given material causes a given performance outcome. Put another way, the relationship between the use of a specific instructional material and the occurrence of specific behavior outcome has not been established. The objection has merit. However, it is doubtful that such a relationship could ever be clearly established in the absence of elaborate and expensive research design procedures. On the other hand, the use of sequential analysis is not for the purpose of establishing such a relationship.

Sequential analysis tells us whether pupils are consistently achieving behavior objectives when certain materials are applied. Further it tells us what that performance level is. The procedure is therefore practical in the sense that teachers are getting or not getting results when the materials are being used. Whether they would have obtained different results with different materials is not at stake. What is at stake is whether, when using certain materials, children demonstrate specific behavior outcomes.

The proposed procedure is economical and simple to apply. It is a procedure which requires a minimum of time to implement. Further, its data are directly applicable to almost any instructional situation. The results of evaluation studies therefore are readily usable by teachers who are attempting to select new materials for classroom use.

Level V. SELECTING MATERIALS AND MEDIA

Part A. Procedures for the Selection of Instructional Materials at Various Stages of the Evaluative Process

PROCEDURES FOR THE SELECTION OF INSTRUCTIONAL MATERIALS AT VARIOUS STAGES OF THE EVALUATIVE PROCESS

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This paper will present a process for the selection of instructional materials. It is assumed, for purposes of this paper, that various amounts of information will be available to educators concerning instructional materials. The available information will fall into one or more of four categories providing differing levels of information. Level I provides identification and classification information. Teacher judgmental information is reported at Level II. Information obtained from expert appraisal concerning the item is presented at Level II. Results of field tests permit information on behavioral change to be presented at Level IV.

Procedures

For any specific material there may not be a complete file of information at all levels on that item. Nevertheless, teachers and resource specialists must frequently make decisions with less than complete information concerning a material's appropriateness for a specific need.

Ideally, materials selection should be based upon a comparison of learner needs with the capabilities of instructional materials. When an appropriate identification is made, instruction should begin. The results of this instruction should be compared with the student objectives. A reassessment of these objectives and of the materials used will provide direction for selecting the next instructional material and for continued programming.

This procedure assumes that teachers, administrators, media people, and resource people will utilize student characteristics for instructional materials selection. Gone are the days of building a collection of instructional materials for each classroom, grade level of subject matter area. Today, decisions should be made in terms of providing what is adequate and appropriate for each student a school serves. Application of this approach requires information on student and instructional materials characteristics or capabilities. Educators obtaining materials would match the two as well as possible, thereby providing adequate and appropriate instructional materials resources.

Any activity must have a beginning. The selection process begins with information derived from Level I, Identification and Classification. Instructional materials must be identified before they can be selected. Identification information must be complete enough to allow the consumer to obtain the instructional material from the originating source if not a secondary source. They must be identified in a classification scheme such that they match with learner characteristics, needs and objectives. Classification information assists the educator in identifying instructional materials in the area of concern (e.g., mathematics, language arts, speech correction, motor, perception, etc.).

Level I information permits a first preliminary screen to eliminate those materials which do not fall into the area of concern for the consumer. This can be accomplished manually or by machine. For this information bank to be useful it must be current and contain a broad range of materials. Information of this nature may appear to be readily available, but the lack of an agreed upon indexing process has prevented that from being the case. Specific procedures for identification and classification are contained in Levine, Nelson & Thornton and Rude, Level I: Parts A, B and C respectively (pp. 33-221).

Materials identified in the process described above should not be selected at face value. It is possible that what materials purport to do is other than their actual achievement. To further aid in selection of appropriate materials, three additional types of information should be considered for ideal selection. Teacher judgments (Level II) report subjective evaluation results. This information may be either based upon experience with the material or a review of the item reporting past experience with similar materials and professional judgments. Second, is the opinion of experts (Level III) in the subject area, handicap area, educational technology or other related areas. They would report subjective evaluation results obtained from the application of previous research, theory or experience. Lastly, is the objective reporting of field test results (Level IV). This would entail reporting sample size, student characteristics, teacher preparation time, teaching time, adherence to teacher guide instructions, and the achievement of students. Also, reported would be the reliability and validity of the assessment tools. Procedures for gathering and reporting Level II, III and IV information are reported earlier in the SOURCEBOOK.

Utilization of information from the preceding three areas (Levels II, III and IV) should not be done in isolation. The skilled selector should look for trends in evaluations across Levels II, III and IV. A material should not be accepted or rejected on the rating in just one of the areas (levels) just mentioned. Positive or negative results in two or more areas would establish a trend and predict a higher probability of success or failure.

That statement is predicated on the assumption that, though an instructional material can be used in a variety of ways, there is a purpose or an objective which it can achieve better than the others. The better designed materials (e.g., Distar, System 80, Reading Labs, Teaching Resource Materials, DLM Materials, etc.) are developed with a particular instructional purpose in mind. It may be utilized for accomplishment of objectives other than those objectives for which it was planned. Doing such might lower the probability of success by a variety of different users.

When we deal with procedures for the selection of instructional materials, preparation of the selector is rarely focused upon. Even if the selector utilizes only information provided at Level I (Identification and Classification), the same preparation is required as if information was utilized from all four levels.

An individual preparing to select appropriate instructional materials must delineate the specific behavioral objective or objectives which are to be accomplished by using the material. The characteristics of the learner which will affect performance must be specified to assure optimum learning. Characteristics and needs of learners must be matched as closely as possible in order to achieve as high a degree of success as possible. The primary basis for selection of instructional materials should be the purpose one has for using it.

Possibly the best programs for preparation of selectors (educators) would focus on matching materials and learner descriptors. It appears that selection of appropriate terms is a major deterrent to proper instructional materials selection. Unless the terms for learner and materials characteristics are compatible or equivalent, selection will become a game of chance. A solution might be to create a general systems model of a learner. This would lead to the generation of descriptors for both learning and materials

A systems model representing the materials selection process is included as Figure 1. The model can be applied to an individual or a specific population. It will assure appropriate materials selection for the learner(s). The most important feature of the model is that appropriate information is gathered on learners. This data is utilized for classification of materials and selection of an optimum combination of learner-materials-teacher environment for optimum learning.

Figure 1 is both a state of the art model and an ideal model. The procedures within each element can be as refined or rough as desired by the user of the model. Models are for problem solving and organization. The statement applies to this model also. Following Figure 1 are two simulations which illustrate its application (see Figures 2 and 3).

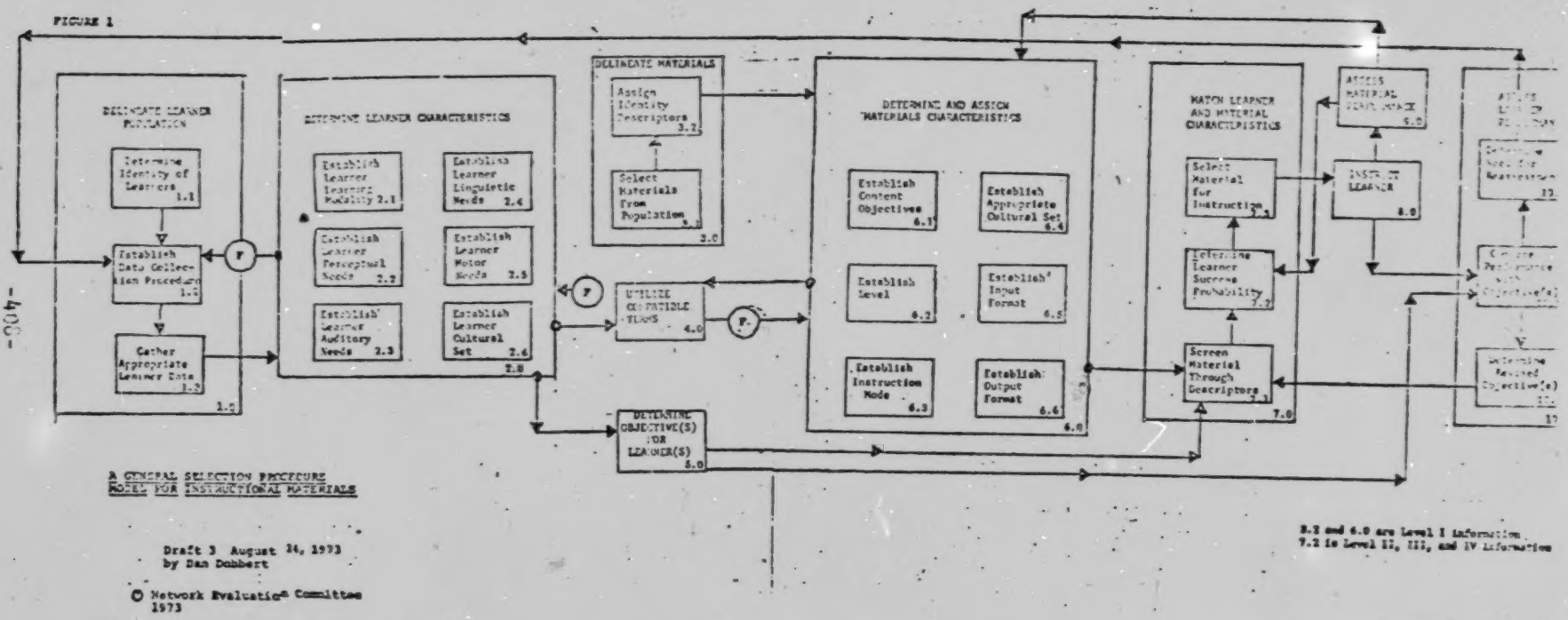
FIGURE 1
DELINEATE LEARNER POPULATION
Determine Identity of Learners 1.1
Establish Data Collection Procedure 1.2
Gather Appropriate Learner Data 1.3
1.0
DETERMINE LEARNER CHARACTERISTICS
Establish Learner Learning Modality 2.1
Establish Learner Linguistic Needs 2.4
Establish Learner Perceptual Needs 2.2
Establish Learner Motor Needs 2.5
Establish Learner Auditory Needs 2.3
Establish Learner Cultural Set 2.6
2.0
DELINEATE MATERIALS
Assign Identity Descriptors 3.2
Select Materials From Population 3.1
3.0
UTILIZE COMPATIBLE TERMS 4.0
DETERMINE OBJECTIVE(S) FOR LEARNER(S) 5.0
DETERMINE AND ASSIGN MATERIALS CHARACTERISTICS
Establish Content Objectives 6.1
Establish Appropriate Cultural Set 6.4
Establish Level 6.2
Establish Input Format 6.5
Establish Instruction Mode 6.3
Establish Output Format 6.6
6.0
MATCH LEARNER AND MATERIAL CHARACTERISTICS
Select Material for Instruction 7.1
Determine Learner Success Probability 7.2
Screen Material Through Descriptors 7.3
7.0
ACCESS MATERIAL VENDOR SPACE 9.0
INSTRUCT LEARNER 8.0
A GENERAL SELECTION PROCEDURE MODEL FOR INSTRUCTIONAL MATERIALS
Draft 3 August 24, 1973
by Dan Dobbert
© Network Evaluation Committee 1973
8.2 and 6.0 are Level I information
7.2 is Level II, III, and IV information

Figure 1.

Figure 2. Simulation I: General Application

Determine the identity of learners to be served by the material(s). (1.1)

Establish a data collection procedure based upon the characteristics of the learner(s). (2.0→1.2)

Gather data necessary to determine characteristics of the learner(s). (1.3→2.0→1.2→1.3)

Determine learner characteristics. (2.0) (1.1→1.2→1.3→2.0)

Materials are selected from the population of commercial and teacher-made materials. (3.1)

Assign identity descriptors to the materials. (3.2)

Determine characteristics of the materials. (6.0) (3.1→3.2→6.0)

Utilize compatible terms for both material and learner characteristics. (4.0) (1.1→1.2→1.3→2.0→1.2→4.0→2.0→6.0→4.0) (3.1→3.2→6.0)

Determine specific objectives for the learner(s). (5.0)

The learner characteristics descriptors and objectives are screened through the materials descriptors. (7.1)

Materials identified are examined to determine their probability of success with the specific learner(s). (7.2)

The materials with the best match and greatest success probability are selected for instructional purposes. (7.3) (5.0→7.1→7.2→7.3) (6.0→7.1→7.2→7.3) (10.2→7.1→7.2→7.3)

The learner is instructed. (8.0)

The performance is compared with the objective(s). (10.1)

If the objectives are achieved then the process recycles or stops. (10.1)

A more probable result would be a less than full achievement or criteria. In this situation the need for reassessment of learner needs or revision of objective(s) is necessary. (10.1→10.3→1.2) or (10.1→10.2→7.1)

441 442

Figure 2. Simulation I: General Application
...continued

Performance of the material is assessed. (9.0) That information is incorporated into either the material characteristics or success probability dependent upon the type of information. (9.0→6.0) (9.0→7.2)

Elements 9.0 and 10.0 are the quality control or maintenance functions of this system. (8.0→10.1→10.3→1.2) (8.0→10.1→10.2→7.1) (8.0→9.0→7.2)

Figure 5. Simulation II: Ideal Application

John is a student in your school. After discussion with his teacher and initial screening, it is decided to administer educational tests A, B, C and D. Only the appropriate subtests of each test are used. This decision is based upon the results of the screening which has pinpointed areas of concern. (1.1→1.2→2.0→1.2→1.3)

It is determined that John has characteristics X, Y, Z, W and Q. Appropriate objectives for John, based upon his characteristics and needs, are developed. (2.0→5.0)

While the educator is working with the learners, materials specialists are identifying, classifying, obtaining teacher and expert judgments, and field testing materials. This is an enormous task as every commercial and teacher-made instructional material is being treated in this manner. (3.1→3.2→6.0→4.0→6.0)

Central in the processes of determining learner(s) and material(s) characteristics is that they be compatible. (4.0) Terminology used will be changing as models of learning and instruction change. The process of determining appropriate descriptors is related directly to the refinement of models of student learning and instruction.

The objectives and learner characteristics X, Y, Z, W and Q are used to select materials descriptors on a one to one match. (7.1) Using those descriptors materials appropriate for the learners, needs and objectives will be listed for the educator.

Because we have given the retrieval system data on our learner-teacher-environment mix it has also ranked our materials list in order of expected success. (7.2) We then select the item(s) that appear most useful. (7.3)

The item(s) selected are used, as directed, for instruction. (8.0)

Results of the instruction are compared with the learner objectives. (5.0→10.1) (8.0→10.1)

The data is also reported to update the assessment of materials performance. (8.0→9.0→7.2)

An analysis of the results will show either a need for learner reassessment (10.3→1.2) or a revised objective (10.2→7.1).

In either case the information is processed through all the remaining elements in the model proceeding basically left to right. As this is a cyclical and simultaneous model with feedback, the procedure could continue indefinitely.

Figure 5. Simulation 1b: Ideal Application ...continued

A run through of the entire model is given below. It may be followed by referring to the values labeling the elements in model.

(1.1→1.2→1.3→2.0→1.2→1.3→2.0→4.0→2.0→5.0→7.1)

(2.0→4.0→6.0→4.0)

(3.1→3.2→6.0→4.0→2.0→4.0→6.0)

(6.0→7.1→7.2→7.3→8.0→9.0→6.0)

(6.0→7.1→7.2→7.3→8.0→9.0→7.2)

(6.0→7.1→7.2→7.3→8.0→10.1→10.2→7.1)

(8.0→10.1→10.3→1.2→1.3→2.0→5.0→7.1→7.2→7.3→8.0)

[illegible]

[illegible]

A method for accomplishing an ongoing training of educators is to practice selection. An efficient procedure for this might be to begin with a Selection Game (e.g., Interaction Teaches) (Levine and Ward, 1972). After utilizing the game as an introduction, the potential selectors should be organized into teams or committees by interest, grade, academic area, learning problem or any combination thereof. The final pattern would be determined by what is most appropriate for the organizational setting. If your staff is organized by grade level and discipline (Learning Disabilities, Mental Retardation, Speech Therapy, etc.), then your committees might be best organized in a similar pattern. What is important here is that your instructional and selection/analyst teams be equivalent. Personnel responsible for each activity need not be the same though decisions should be made in terms of the learner. Practice and specific procedures will optimize appropriate selection.

Summary

Educators will be more likely to react positively to those materials or programs they have had a voice in selecting than those selected for them. People apparently will exert extra effort to making something succeed if they believe in it. For that reason, wide involvement is strongly urged.

All the preceding discussion on materials selection relies on the availability of adequate and appropriate information. Establishment of systems for the gathering, delivery and dissemination of adequate and appropriate information on instructional materials for special education is the objective of the SOURCEBOOK.

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Level V. SELECTING MATERIALS AND MEDIA

Part B. Selecting Instructional Materials

SELECTING INSTRUCTIONAL MATERIALS

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The purpose of this paper is to present a procedure for selecting instructional materials for use in the classroom. Because instructional materials vary so greatly, the selection process can be quite troublesome.

Instructional materials vary along two major dimensions: internal and external. These terms are similar, but not identical, to the three sources of information previously identified (Sanders and Cunningham, 1973). The major difference lies in the type of information sought (Sanders and Cunningham, 1973). Internal dimensions refer to the content of the material (i.e., what is to be taught by using the material, the curricular logic, and the time elements involved in teaching the content).

Internal dimensions include:

1. the target populations for which the materials were designed.
2. the scope of the materials, or the depth of the content the materials were designed to cover.
3. the specificity of the instructional goals (objectives).
4. the sequential progression of the instructional goals (curricular logic).
5. the number of lessons for which the materials were designed.
6. the time required to conduct individual lessons.

The external dimensions refer to the physical properties of the material; the stimuli contained in the material, the packaging of the material, the availability and transportability of the package.

Internal Dimensions

Along each of the internal dimensions instructional materials vary in numerous ways. The target populations for which some materials have been designed are clearly indicated in the materials package.

In other instances the target populations are not indicated in any way. There also is the fact that a large number of materials may be used with widely divergent populations.

The scope of the materials, or the depth of the content the materials were designed to cover, may be quite variable. In some cases instructional goals (objectives) may be clear and specific. In other cases the goals may not be specified in any way. In certain situations an instructional material may be useful for meeting instructional goals not described in the materials packaging. It is also possible that some materials do not help children reach the instructional goals intended by the designer, but rather aid in accomplishing goals which have not been identified within the package. Instructional goals may follow an orderly, sequential progression from first to last lesson (curricular logic has been followed). In other instances the curricular logic of the material may be weak or non-existent.

The number of lessons for which the materials were designed may range from one lesson to one, two or more years. The amount of time required to conduct the lesson(s) may vary greatly. Some lessons may take just a few minutes. Other lessons may take one or more periods to complete.

External Dimensions

Some instructional materials packages are complete. That is, the package contains all the items necessary for the teacher to use the material. In some instances only difficult to obtain items are included. In other cases the teacher may be provided with a list of necessary materials; and in some instances, the teacher is left to surmise what items will be necessary to conduct the lesson.

Instructional materials vary greatly in their compactness. Some instructional materials are contained in easily managed packages which are readily transportable. Other materials may be contained in several packages and/or require one or more pieces of equipment (i.e., tape recorder and projector) to be usable in the classroom.

An instructional material may be readily transportable. That is, the materials package may be complete, compact, and transportable. It is also true that a material may be as complete and as compact as possible and still not be transportable. For some situations, the learners may have to be brought to the material. The material is stationary.

The amount of access teachers have to materials varies greatly from school to school, district to district, and region to region. In some cases the teacher has ready access to a large variety of

materials. In other situations the opposite is true.

The problem for the teacher is to select from this diversity the material, or set of materials, which will result in the most productive instructional effort. The selection process may be random (a "grab bag" approach) or systematic. The procedures described below have been designed to systematize the process.

Rationale

The teacher has in mind, if not in writing, an instructional goal. This instructional goal limits the universe of materials from which the selection may be made. The teacher has eliminated all nonreading materials by specifying reading. By specifying phonics, all nonphonic reading materials have been eliminated. By including grade level, all materials that are inappropriate to that level have been excluded. The teacher may include visual, manipulable, or three dimensional in the criteria for selection.

The universe of available instructional materials is more clearly refined as the instructional goal becomes more specific. Selection processes have been developed for use with specific instructional goals (e.g., Adamson and Van Etten, 1970; Rude, 1972).

In developing the procedures, these purposes for evaluation were considered: (1) to provide a data base for "valuing" (Reynolds, 1966) instructional material "A" more (the same as, or less) than instructional material "B" under similar conditions of use; (2) to provide a data base for valuing instructional material "A" differently under different conditions of use; (3) to make differential value statements about instructional materials A,...N under conditions of use and populations heretofore untested.[1]

Value statements are made about instructional materials if they demonstrate "efficiency" (Bricker, 1970). That is, a maximum number of learners from a specified population should demonstrate attainment of the goal with a minimum expenditure of time and money. To be efficient the material must be "valid"; there must be evidence that some learners have attained the goal (Bricker, 1970). In other words, the material must do that for which it was designed. The material may do other things, but, at least, it should facilitate attainment of the specified goal. However, because a material is valid does not mean that the material is efficient. A learner may demonstrate attainment of the goal but at considerable expense in terms of teacher and/or

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[1] The proximity of the consumer's situation to the particular instructional material in the Introduction provides a framework for these concerns and purposes.

learner time and at considerable financial expense.

To be efficient the materials must be available for use. For a particular teacher, an inaccessable material is neither efficient nor inefficient; it may be equated with non-existent materials.

The phrase "minimum expenditure of time and money" should not be equated with "quick" and "cheap." The phrase is meant to imply the best possible approach to the problem. The problem may be difficult. If so, considerable time and money may be required to effect the desired learner performance. If the problem is of sufficient educational relevance, then it should be reached as efficiently as possible.

In summary, the procedures for selecting instructional materials should take into account the diversity that exists in the field of instructional materials. The procedures, about to be described, have been designed to provide a means for successively narrowing the universe of materials and are based upon the concept of efficiency (see Figure 1).

Description of Procedures

A worksheet has been developed to facilitate the selection process (see Appendix A). The content of the sheet will be described below.

Material Identification Information

The process is initiated by identifying what material is being considered. Identifying the material makes possible the comparison of two or more materials, particularly when two or more materials may achieve similar goals. Also, when a material has been selected, purchasing information is readily available. Further, should instructional goals be stated in the package the teacher can compare those goals with the ones identified for the teaching situation.

Consumer's Situation Classification: Expected Outcomes

After the materials reference, the procedures call for a statement of the specific instructional goals to be attained by the learners. In other words, what child behavior will the teacher concentrate upon? For example, the child behavior may be increased vocabulary, increased reading speed, or improved phonic skills. If the focus is upon phonics skills, then those basal readers which do not concentrate upon phonics have been eliminated.

Instructional Materials Universe

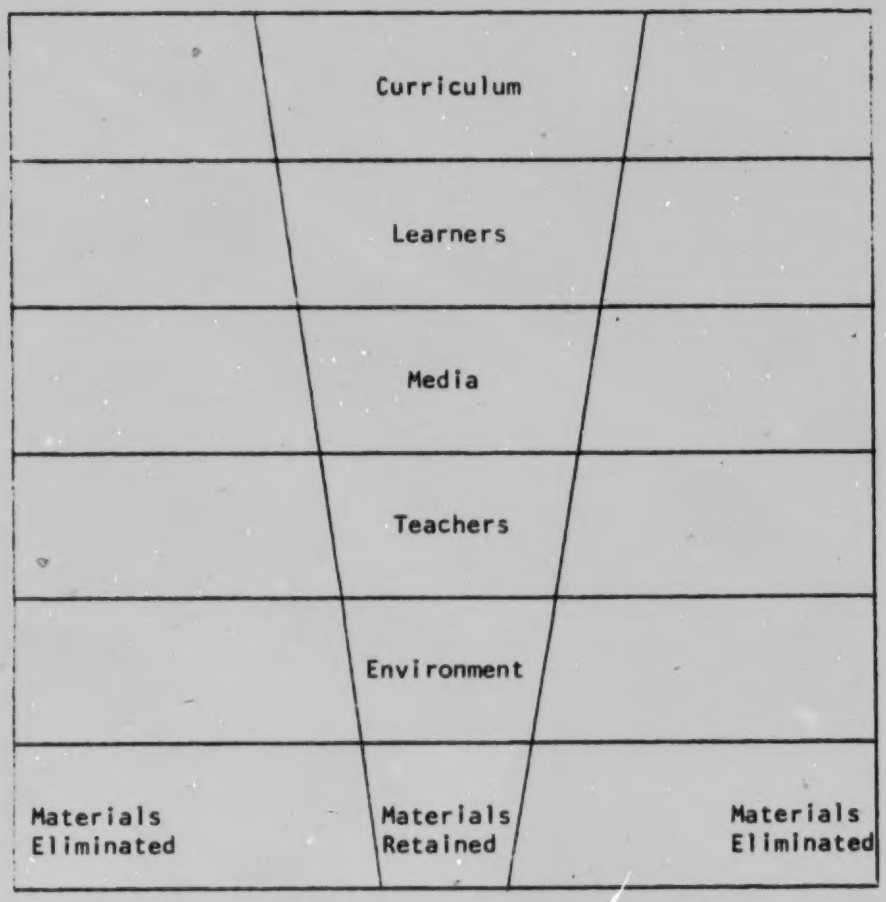

Figure 1. Conceptual Model for Worksheet.

Consumer's Situation Classification by Material Classification: Conditions of Use

The materials description reflects concern for both the internal and external dimensions of materials. Questions relating to the internal dimensions have been designed to provide information about the appropriateness of the material for a given set of learners. First, what are the characteristics of the learners the consumer (teacher) wishes to teach? (consumer: learners). What are the characteristics of the learners for whom the instructional material or media was designed? (materials: learners). What content does the teacher wish to teach? (consumer: curriculum). What content does the instructional material teach? (material: curriculum). What sequential organization does the teacher want for teaching? (consumer: curriculum). What sequential organization does the material offer? (material: curriculum). How many lessons in this area of content does the teacher want to teach? (consumer: curriculum). How many lessons does the instructional material or program offer? (material: curriculum). How long should the lessons be for the class of pupils this teacher wishes to teach? (consumer: curriculum). How long are the lessons in this instructional material or program? (material: curriculum). What type of stimulus does the teacher want to be imbedded in the material? (consumer: instruction). What type of stimulus is imbedded in the material? (material: instruction).

The internal dimensions of the selected instructional material must be based upon the teacher specified situation for its use. This provides a basis for eliminating numerous materials which do not favorably reflect the internal dimensions the teacher feels are necessary for the learning task.

Consumer's Situation by Material: Media or Material Characteristics

Questions relating to the external dimensions of the material have been designed to provide information about the appropriateness and utility of a given material in a defined situation. External dimensions refer to the physical characteristics of the material as it is provided for the teacher. The questions of concern are: Is it important to the teacher that the materials be complete and compact? (consumer: media and materials). Is the material complete and compact? (material: media and materials). Is it important to the teacher for the materials to be available immediately? (consumer: media and materials). Are the materials available immediately? (material: media and materials). Is it important to the teacher that the materials be transportable? (consumer: media and materials). Is the material transportable? (material: media and materials).

Other questions relating to external dimensions are concerned with more generally descriptive information. These questions include concerns about the type of material (printed, visual, audial, etc.), number of copies needed (consumer) and available (material), whether the material is reusable or not, and whether the material can be delivered or whether it must be obtained at a central location.

Still other questions deal with the time factor: how much time does the teacher have to devote to the teaching of these concepts? (consumer: curriculum), and how much time is required by the material to teach these concepts? (material: curriculum)

The final question asks for an estimate of the time necessary for the learner to achieve the instructional goal. It is a two part question. First, how much time will the teacher need to instruct the learner? Secondly, how much time will the learner need to attain the goal? Extra teacher instructional time may be difficult to obtain, or the time necessary to instruct learners in the use of the material may be excessive. If so, is the time expenditure justifiable? One must look to the goal of instruction.

From the learner's point of view, will the time necessary to complete the learning justify attainment of the goal? In other words, is this the shortest possible route to the goal? If the answer is unknown, other factors will influence a "go"-"no go" decision with this material.

Consumer's Situation Information: Learners

Defining the population with whom the materials are to be used serves several purposes. These purposes include: (1) knowing how many materials will be necessary (quantity for purchasing), (2) knowing learner characteristics, (3) knowing the type of materials usable with certain populations (e.g., estimated reading level of an EMR population), (4) making estimates of the learner time necessary to achieve the desired behavior and (5) making estimates of the teacher time necessary to achieve the desired behavior.

The first step is to indicate the number of learners who are going to use the material--obviously, a cost factor, but also reflecting upon the availability of the material. If one learner is to use the material and two copies are readily available, there will be little conflict about using the material. However, if six learners are to use the material and two copies are available, different considerations are necessary.

The second step is to specify the appropriate population descriptors (primary and secondary handicap, culture, socio-economic status, and intelligence and achievement). Primary handicap refers

to the most pronounced educationally limiting problem. Secondary handicap refers to the most pronounced secondary educationally limiting problem. The descriptors in this category are the more commonly used terms. No attempt was made to account for all the possible descriptors available throughout the states and the regions.

Identifying any particular cultural features in the sample aids in determining both the accessibility and the type of materials considered appropriate. A particular group of youngsters from homes where a particular foreign language is the primary language may be far more prevalent in some areas of the country than in others. It may be far easier to identify a group of youngsters from French speaking homes in Maine than in Arizona. Reading materials for youngsters in English as a Second Language (ESL) programs may either be eliminated or all other materials may be eliminated.

Descriptions of the population should include the socioeconomic status of the learners. Materials appropriate for urban black youngsters may differ from materials appropriate for suburban black children. The life experiences of these children may be very different.

Intelligence test data on the population continue to refine the range of materials appropriate. Reading materials appropriate for average first grade readers may not be appropriate for 14 year old youngsters with mental ages (MA's) of seven, intelligence quotients (IQ's) of 50 and reading achievement scores ranging from readiness level to grade two. The scores are helpful in defining the population. An index of the variability of the scores helps define the upper and lower intellectual limits which must be imposed upon the materials.

Selecting an appropriate material will be dependent upon the academic abilities of the population. Tests upon which the scores are (or will be) based facilitate the comparison of two or more materials. Since the several reading series differ in difficulty at a given grade level, choosing a particular series for evaluation cannot be made solely upon the grade level indicated on the books. The selection process must be made on the basis of match between the level of the particular series <u>and</u> the ability of the children in the consumer's group.

<u>Materials and Consumer's Situation Information: Teachers and Instruction</u>

The procedures described herein take no account of teacher-pupil interactions. Including certain information about the teachers and their preferred methods of instruction is considered to be important to the selection process.

Material Information: Teacher

There must be some estimate of the inservice training necessary for the effective use of a given material. If material "A" can be implemented with five hours of inservice training while material "B" might require 10 hours, and if both materials will achieve similar goals, material "A" will be more efficient in terms of in-service training (other considerations being equal). The cost of in-service training may also play a part in the selection of the material.

Consumer Information: Teacher

Information must also be obtained from the teacher or consumer relative to the amount of time the teacher has to devote to inservice training and the willingness of the teacher to engage in such training. Information about the amount of money the consumer (teacher) is willing to pay for such training will also be important.

Consumer's Situation: Environment

There should be some indication of the general location of the classroom. For example, if the teacher is located in an institution, numerous materials may be outside the life experiences of the learners. Providing such experiences may be the goal for the material (e.g., videotape of a trip to the zoo). Where the teacher is located may also suggest the types of materials that will be available.

Material: Environment

Materials are designed for particular environments. For example, some reading series have been developed expressly for urban children. The content of the pictures and stories may be such that institutionalized youngsters simply get no meaning from them.

Discussion

A worksheet has been developed to facilitate the selection of instructional materials (Appendix A) by providing a teacher situation assessment form. The content, or questions, were developed with efficiency in time and money as the central theme. The worksheet was developed around five major situational areas. Each situational area is designed to reduce the universe of instructional materials to be considered. The five areas are:

Curriculum
Learners
Media
Teachers
Environment

The purpose of the worksheet is to provide a system of successively reducing the field of materials until a few materials remain which are applicable to the consumer's situation (see Figure 1). From the remaining materials, specific decisions are to be made in light of issues of immediate but unspecified concern to the consumer. The worksheet could be far more definitive, particularly in terms of the population description (see Rude, 1972, for example).

Once the worksheet is filled out, the conditions of the consumer's situation can be compared to the information obtained in the Level I analysis of instructional materials (see Rude, Level I, Part C, pp. 109-219). The consumer situational information derived from the worksheet may be compared to several materials. For example, inservice training costs may be the crucial variable for selecting one of several materials designed to develop a particular behavior in learners. It is possible that transporting the materials is of major concern; only those items which reflect that concern may be given special attention. The worksheet is the first, rather than the last one. It has not been thoroughly tested. If through testing it proves to have merit, revisions and refinement not surely follow.

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APPENDIX A

Consumer Situation Assessment Form

CONSUMER SITUTIONAL ASSESSMENT FORM

IMC/RMC/RRC

Name _____ Number _____

Address _____ Phone _____

_____ Date _____

School _____ Time _____

Address _____

_____

A. [illegible]

1. [illegible]tional goals or objectives?

_____

_____

_____

_____

(Directions: Write the instructional goals (child behaviors) to be attained by the learners. Be as specific as possible.)

2. What is the specific content area and skills area you wish to cover in this instruction?

_____

_____

_____

_____

(Directions: Use the Capps Coding Guide's delineation of content descriptors--see Rude, Appendix A, pp. 122-131)

B. LEARNERS

1. What is the level of the pupils you wish to instruct?

_____

_____

2. Number of learners _____

(Directions: On the blank indicate the approximate number of learners to be included in the activity.)

3. Pupil Descriptors

(Directions: On the list provided, mark the most appropriate descriptors of the population for the activity.)

4. Primary Handicap	Secondary Handicap
__ Visually Impaired	__ Visually Impaired
__ Blind	__ Blind
__ Hearing Impaired	__ Hearing Impaired
__ Deaf	__ Deaf
__ Deaf-Blind	__ Deaf-Blind
__ Physically Handicapped	__ Physically Handicapped
__ Speech Impaired	__ Speech Impaired
__ Learning Disabled	__ Learning Disabled
__ Educable Mentally Retarded	__ Educable Mentally Retarded
__ Trainable Mentally Retarded	__ Trainable Mentally Retarded
__ Severely and Profoundly Retarded	__ Severely and Profoundly Retarded
__ Emotionally Disturbed	__ Emotionally Disturbed
__ Multiple Handicaps	__ Multiple Handicaps

5. Culture

Race _____
(specify: white, black, etc.)

Socio-Economic Status

___ Lower ___ Middle ___ Upper

___ Urban ___ Suburban ___ Rural

6. Intelligence and Achievement

(Directions: Fill in the blanks with the appropriate data, based upon estimated group scores.)

Average Chronological Age _____

Average Mental Age _____

Average Intelligence Quotient _____

Intelligence Tests Used
to Derive Scores _____

Average Achievement in:

Reading	_____	test	_____	range	_____
Arithmetic	_____	test	_____	range	_____
Spelling	_____	test	_____	range	_____
Social Studies	_____	test	_____	range	_____
Geography	_____	test	_____	range	_____
History	_____	test	_____	range	_____
Science	_____	test	_____	range	_____
Oral Language	_____	test	_____	range	_____
Manual Language	_____	test	_____	range	_____
Braille	_____	test	_____	range	_____
Typing	_____	test	_____	range	_____
Mobility	_____	test	_____	range	_____

7. Describe any Specific Disabilities

_____

_____

_____

_____

_____

_____

8. What sensory channel is most appropriate for your pupil(s)?

___ Auditory ___ Auditory-Visual

___ Visual ___ Visual-Tactile

___ Tactile ___ Auditory-Tactile

(Directions: If the meaning of these terms is not clear--see Rude, Appendix A, p. 133)

C. MEDIA

1. What kind of material would you prefer?

_____

_____

_____

_____

(Directions: Use the MARS Coding Guide's Terms for Material Format descriptions --see Rude, Appendix A, p. 132.)

2. Note your concerns relative to the following:

Completeness of the materials package ___

Compactness of the materials package ___

Transportability of the materials package ___

Material availability in time ___

Material reusability ___

(Directions: Use the following scale to indicate your concerns:)

1 = of no importance to me.
2 = of little importance to me.
3 = of some importance to me.
4 = very important to me.

3. How soon do you need the material?

Immediately ___

In hours from now; specify _____ hour(s)
In days from now; specify _____ day(s)
In months from now; specify _____ month(s)

D. TEACHERS

1. How much time can you spend in inservice training to prepare using the materials selected?

_____ hours _____ days _____ months

(Directions: Indicate the maximum amount of time only)

2. How much money can you spend for inservice or specialized training to prepare for the use of the materials selected?

$ _____

(Directions: Indicate the maximum amount of money only.)

E. ENVIRONMENT

1. The classroom located in

(Directions: Mark the most appropriate item)

___ a. inner city

___ b. urban

___ c. suburban

___ d. rural

2. The classroom is located in

___ a. a regular public school

___ b. in a special day school

___ c. in a residential school

___ d. in an institution

SOURCEBOOK APPENDIX I

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SOURCEBOOK APPENDIX II

Forms File

EDUCATIONAL FACILITIES CENTER[1]

EVALUATION OF A MULTI-ELEMENT INSTRUCTIONAL SYSTEM

This instrument presents four broad viewpoints from which any multi-element instructional system may be evaluated. It is flexible, enabling the using educator to employ those viewpoints that are applicable. Each viewpoint section includes a five point acceptability scale, and space for comments.

Producer _____

Name of System _____

[1] Educational Facilities Center, 233 North Michigan Avenue, Chicago, Illinois 60601.

I. OBJECTIVES

1. Does the system include a statement of instructional objectives? ___ yes ___ no

2. Is this statement detailed enough to be helpful? ___ yes ___ no

3. Is this statement directed: ___ to the teacher only, or ___ to both teacher and students.

4. If the system's objectives are unstated, are they obvious: ___ to the teacher only ___ to both teacher and students ___ to neither teacher nor students.

5. Are the objectives readily compatible with individualized or self paced instruction. ___ yes ___ no

6. Do the objectives invite the student's affective involvement? ___ yes ___ no

7. Do the objectives appear to involve only cognitive development? ___ yes ___ no

8. Are the objectives conceived in a tight relation to the subject matter only ___ yes ___ no; or are they conceived in relation to a student's human development? ___ yes ___ no

From the viewpoint of objectives, the system is:

1 ___ unacceptable 2 ___ acceptable with reservations 3 ___ acceptable
4 ___ more than acceptable 5 ___ excellent

Comments?

II. [illegible]

1. Are all elements of the system reasonably easy to use ___ yes ___ no; only some elements ___ yes ___no

2. Is the system flexible ___ yes ___ no; or is it a tight, step by step program ___ yes ___ no.

3. Are special skills or extensive preparation required before the teacher can employ the system ___ yes ___ no

4. If equipment is included, is it easily used by the teacher ___ yes ___ no; by the students ___ yes ___ no

5. Are the system's materials readily used by the students ___ yes ___ no

6. Do you know of evidence of the system's successful use in other educational settings ___ yes ___ no

7. Does the system present any unusual storage problems ___ yes ___ no; or problems of distribution to students ___ yes ___ no.

8. Does using the system actively involve the students ___ yes ___ no

9. Does the system arouse and sustain student interest ___ yes ___ no

10. Does the system offer adequate evaluation procedures for the teacher ___ yes ___ no; for the student ___ yes ___ no

11. Is there a good match between the evaluation procedures and the systems objectives ___ yes ___ no

12. Did you find the evaluation procedures adequate ___ yes ___ no

Acceptability Scale

1 ___ unacceptable 2 ___ acceptable with reservations 3 ___ acceptable

4 ___ more than acceptable 5___ excellent

Comments?

III. QUALITY OF CONTENT

1. Is the system's content authentic (and, if applicable) accurate?
___ yes ___ no

2. Is the content timely (if applicable) ___ yes ___ no

3. Are the illustrations and examples apt for your students?
___ yes ___ no

4. Does the content communicate effectively? ___ yes ___ no

5. Are the system's sensory aspects (sound, color, visuals, etc.) appropriate? ___ yes ___ no

6. Is the system designed for ease of student progression ___ yes ___ no

7. Is the system's vocabulary appropriate for your students ___ yes ___ no

8. Is the content presented clearly ___ yes ___ no

9. Did your students find the content relevant and interesting
___ yes ___ no

Acceptability Scale

1 ___ unacceptable 2___ acceptable with reservations 3___ acceptable
4 ___ more than acceptable 5 ___ excellent

Comments?

IV. QUALITY OF CONSTRUCTION

1. Does the system present any unusual maintenance problems?
___ yes ___ no

2. Did you find the system sufficiently durable ___ yes ___ no

3. Are the system's elements well designed? ___ yes ___ no

4. Did the system present any safety problems? ___ yes ___ no

5. If the system contains equipment, does it operate reliably?
___ yes ___ no

6. If equipment repairs were needed, was the repair service adequate?
___ yes ___ no

7. Were such repairs required frequently? ___ yes ___ no

8. Were such repairs made easily and quickly? ___ yes ___ no

Acceptability Scale

1 ___ unacceptable 2___ acceptable with reservations 3 ___ acceptable
4 ___ more than acceptable 5 ___ excellent

Comments?

V. FURTHER CONSIDERATIONS REQUESTED BY THE COMPANY

TITLE OF KIT

KIT NUMBER

SCHOOL

DATES KIT USED

DATE OF EVALUATION

KIT EVALUATION BOCES CATTARAUGUS COUNTY MULTI MEDIA PROJECT OFFICE OLEAN, N.Y.

TEACHER

GRADE

SUBJECT TAUGHT WITH KIT

PLEASE TAKE TIME TO ANSWER THE FOLLOWING QUESTIONS. IT IS VERY IMPORTANT TO THE FUTURE OF OUR PROJECT. CHECK THE APPROPRIATE BOXES. ADD YOUR COMMENTS TO QUESTIONS 20 - 30. USE REVERSE SIDE IF NECESSARY

No. of Students Using Materials

DID STUDENTS ASK PERMISSION TO USE MEDIA ON AN INDIVIDUAL BASIS?	DID TEACHERS OF OTHER GRADE LEVELS OR SUBJECT MATTER FIELDS BECOME INVOLVED WITH THE KIT?
DID TEACHER ALLOW SOME STUDENTS TO USE SOME MEDIA ON AN INDIVIDUAL BASIS?	WERE THERE ANY INTERESTED OBSERVERS IN THE CLASSROOM WHILE KIT MATERIALS WERE BEING USED?
DID TEACHER ASSIGN STUDENTS TO USE SOME MEDIA ON AN INDIVIDUAL BASIS?	DOES THE KIT GIVE YOU MORE TIME FOR PLANNING OR RESEARCH?
WERE ANY ITEMS REQUIRING EQUIPMENT USAGE USED MORE THAN ONCE IN EACH CLASS FOR REINFORCEMENT OF LEARNING?	DOES THE KIT HELP ROUND OUT YOUR KNOWLEDGE OF THE SUBJECT MATTER?
WERE FILMS, TAPES AND RECORDS INTERRUPTED FOR QUESTIONS, DISCUSSIONS OR EMPHASIS?	WAS INTEREST AROUSED TO SUCH AN EXTENT THAT YOU OR YOUR SCHOOL DECIDED TO CONSTRUCT KITS ON YOUR OWN?
DID USE OF KIT STIMULATE RELATED ACTIVITIES? (I. E. FIELD TRIPS)	DID YOU FEEL REGIMENTED WHEN USING THE KIT?
WERE FILMS ADAPTED TO THE ACADEMIC LEVEL OF THE GROUP BY SUBSTITUTION OF COMMENTARY FOR THE SOUND TRACK?	WERE ADDITIONAL MEDIA (NOT PART OF KIT) USED IN THE LESSONS?
WERE TRANSPARENCIES USED TO REPLACE SESSIONS AT THE BLACKBOARD?	WILL YOU USE THE KIT AGAIN NEXT YEAR?
WAS MORE THAN ONE CLASS PRESENT FOR AT LEAST ONE OF THE SESSIONS IN THE KIT? (COMPLETE ONLY WHERE A SCHOOL HAS MORE THAN ONE SECTION OF A GRADE)	WILL YOU ORDER ANOTHER KIT? (IF NOT PLEASE SPECIFY)

PLEASE CHECK THE EQUIPMENT USED IN CONNECTION WITH THIS KIT?

A 16 MM PROJECTOR ☐ C 8 MM PROJECTOR ☐ E SLIDE PROJ ☐ G. TAPE RECORDER ☐
B FILMSTRIP PROJ ☐ D OVERHEAD PROJ ☐ F RECORD PLAYER ☐

PLEASE COMMENT ON THE FOLLOWING QUESTIONS

WILL YOU REQUEST YOUR SCHOOL TO PURCHASE ADDITIONAL MATERIAL OR EQUIPMENT BASED ON USE OF THIS KIT? (PLEASE SPECIFY)	YES ☐ NO ☐ DON'T KNOW ☐
DOES THE KIT ENCOURAGE PLANNING AMONG THE TEACHERS OF THE SECTIONS OF A GIVEN GRADE?	YES ☐ NO ☐ DON'T KNOW ☐
IN YOUR OPINION DID THE KIT CONTRIBUTE TO INCREASED STUDENT INTEREST?	YES ☐ NO ☐ DON'T KNOW ☐
DO YOU SEE A NEED FOR IN - SERVICE TRAINING TO INCREASE PROFICIENCY IN THE USE OF THE VARIOUS MEDIA? (IF YES SPECIFY WHICH MEDIA)	YES ☐ NO ☐ DON'T KNOW ☐
WAS THE TEACHER'S GUIDE ADEQUATE? (IF NOT, SPECIFY OR MAKE SUGGESTIONS)	YES ☐ NO ☐ DON'T KNOW ☐
WHAT MATERIALS IN THE KIT ARE INAPPROPRIATE TO GRADE LEVEL OR SUBJECT? (PLEASE SPECIFY)	NONE ☐ SOME ☐
WHAT MATERIALS SHOULD BE REMOVED AS BEING OF LITTLE VALUE? (PLEASE SPECIFY)	NONE ☐ SOME ☐
WHAT MATERIALS COULD OR SHOULD BE ADDED? (PLEASE SPECIFY)	NONE ☐ SOME ☐
WHAT NEW USE DID YOU MAKE OF MATERIALS THAT WERE NOT SUGGESTED IN THE TEACHER'S GUIDE?	NONE ☐ SOME ☐
WHAT SUGGESTIONS DO YOU HAVE FOR IMPROVING THE KIT OR ITS USE?	NONE ☐ SOME ☐
DID YOU RECEIVE ASSISTANCE FROM THESE NON SCHOOL PERSONNEL? LIBRARIAN YES ☐ NO ☐ CURRICULUM SPECIALIST YES ☐ NO ☐ AUDIO - VISUAL SPECIALIST YES ☐ NO ☐	NONE ☐ SOME ☐

TEACHER RESPONSE FORM

Name _____

School _____

District _____ State _____ Date ____ Phone _____

1. Title, manufacturer/distributor of material _____

_____

2. Type of instructional material (printed, record, film, slide, workbook, etc. _____

3. Subject area (content) _____

4. Did material content fit in with your curriculum? Very well Well Fair Poor Not at all

5. Teacher preparation: Great (2 hrs. plus -) Moderate (30 min. - 1 hr.) Little (15 min. - 30 min.)

6. Was instructional manual included? Yes No

7. Was instructional manual useful, easy to understand? Good Fair Poor

8. I used this material with? TMR EMR Emotionally disturbed Learning disabilities Speech impaired Hearing impaired Visually impaired Physically handicapped Other _____

9. This material is most suitable for: Pre-school Primary Intermediate Junior High Senior High

10. I used this material with: Individual Small group Large group

11. This material is best used with: Boys Girls Both

12. This material is best used: As is By using only parts By adapting with other materials.

13. The material content . . did . . did not . . meet the instructional objectives of my lesson plan.

14. The material presentation was: Effective Ineffective Had no effect in motivating the student(s) to learn the concepts I was trying to teach.

15. I would use this material often enough with my students to justify its placement in: a. ( ) my classroom b. ( ) an Associate Sp. Ed. Materials Center serving my school so that I may have access to this material periodically.

SIDE ONE

INSTRUCTIONAL MATERIALS EVALUATION FORM

SPECIAL EDUCATION INSTRUCTIONAL MATERIALS CENTER
THE UNIVERSITY OF TEXAS AT AUSTIN
2613 WICHITA STREET
AUSTIN, TEXAS 78712

DRAFT

1. Material title ____________________

DIRECTIONS: Below are listed items which are thought to be critical to the evaluation of instructional materials made available through the UT-SEIMC. Using a number two pencil, please fill in the box next to the appropriate response. For example, in Item 2, if you had requested this material for use with more than six children, then you would fill in the box labeled 6 or more. Mark the box labeled NA when a question is not applicable.

NOTE: Should you wish to change a response, be sure to erase the incorrect response completely. Multiple responses may be made to Item numbers 7, 8, 9, and 10.

2. Number of pupils for whom material requested: 1 / 2 / 3 / 4 / 5 / 6 or more

3. Number of years working: None / Less than 1 / 1 to 4 / 5 to 9 / 10 to 14 / 15 to 19 / 20 or more

4. Highest degree attained: High School / BA/BS / MA/MS / EdD/PhD/

5. Certification: Elem. / Sec. / Sp.Ed. / NA

6. Working toward certification in: Elem / Sec. / Sp.Ed. / NA

7. Capacity in which you serve exceptional children:

- Special Class Teacher
- Special Ed. Counselor
- Hearing Therapist
- Resource Teacher
- Regular Class Teacher
- Ed. Diagnostician
- Teacher Aide
- Other (please specify): ____________
- Special Ed. Supervisor
- School Psychologist
- Student
- Spec. Ed. Visiting Teacher
- Speech Therapist
- Diagnostic Teacher

8. With what type of children are you planning to use this set of materials?

- Physically Handicapped
- Multiply Handicapped
- Speech Impaired
- L/LD
- Special Health Problems
- Profoundly Retarded
- Regular Class
- EMR
- Emotionally Disturbed
- Partially Sighted
- Blind
- TMR
- Minimally Brain-injured
- Hard of Hearing
- Deaf
- Other: ____________

9. Educational level of material desired: pre-school / 6-7yrs. / 8-9yrs. / 10-11yrs. / 12-13yrs. / 14-15yrs. / 16-17yrs. / 18-up

10. Current location of instructional program:

- Public School, Regular Class
- Homebound
- Publicly Funded Special Day School
- Public School, Special Class
- Hospital
- Resource Room
- State School/Hospital, Residential
- Private Day School
- Other: ____________
- State School/Hospital, Day School
- Private Residential School

11. Material used:
With pupils / For examination purposes only

UF 9017 [illegible]

Side Two

INSTRUCTIONAL MATERIALS EVALUATION FORM

Material title _____

DO NOT USE

Part I: Please state your behavioral objectives relative to the material being evaluated. For example, you may be trying to teach fractions to your students.

Behavioral objective _____

Part II. DIRECTIONS. The purpose of this assessment is to provide an of instructional material effectiveness. The following variables have been selected to aid you in your evaluation. Next to each variable are three boxes labeled +, -, NA, which you may use to indicate your feeling about that area of the material. FOR example, if you felt that the material met your behavioral objectives then you would fill in the box labeled plus (+). Some of the variables may not be pertinent to the material being evaluated in that case you should fill in the box labeled not applicable (NA).

Should you have suggestions to how the material might be improved for use with exceptional children please list them in the area labeled comments. Thank you for your cooperation in this endeavor.

	+	-	NA	
				CURRICULUM EMPHASIS:
2.	☐	☐	☐	·Fits existing behavioral objectives
3.	☐	☐	☐	·Can be extended to other phases of curriculum.
4.	☐	☐	☐	·Helps accomplish objectives of curriculum
5.	☐	☐	☐	·Organized for sequential development of concepts/skills
6.	☐	☐	☐	·Enables student to practice and maintain concepts/skills
7.	☐	☐	☐	·Provision made to evaluate progress.
8.	☐	☐	☐	·Enables student exploration, problem solving, discovery
9.	☐	☐	☐	·Allows flexibility, provides for individual differences.
10.	☐	☐	☐	·Motivating to the student.
11.	☐	☐	☐	·Multi-sensory in approach
				APPROPRIATENESS:
12.	☐	☐	☐	·Content
13.	☐	☐	☐	·Interest level
14.	☐	☐	☐	·Reading level

	+	-	NA	
15.	☐	☐	☐	·Vocabulary
16.	☐	☐	☐	·Graphic illustrations
				INSTRUCTIONS
17.	☐	☐	☐	·For the student are clear, concise, easily understood
18.	☐	☐	☐	·For the teacher are appropriate and easily followed.
19.	☐	☐	☐	·Allows independent use by student.
				PHYSICAL CHARACTERISTICS
20.	☐	☐	☐	·Format
21.	☐	☐	☐	·Type size, paper, binding, material used in construction
22.	☐	☐	☐	·Size, number of parts, portability, storage factor
23.	☐	☐	☐	·Durability
				GENERAL
24.	☐	☐	☐	·Requires in-service training by users
25.	☐	☐	☐	·Teaching value or effectiveness justifies its cost
26.	☐	☐	☐	·Requires adaptation for present purpose.

COMMENTS

INSTRUCTIONAL MATERIALS EVALUATION FORM*

* * * * * * * * * * * *

Bibliographic Data

* * * * * * * * * * * *

Name of Item _____

Publisher _____

_____

_____

Date of Publication _____ Cost _____ Level of Use _____

* * * * * * * * * * * *

Evaluation Data

* * * * * * * * * * * *

	Excellent (4)	Good (3)	Fair (2)	Poor (1)
I. Physical Characteristics				
A. Durability				
B. Consumability				
C. Replaceable				
D. Price				
E. Toxicity				
F. Physical Safety				
G. Ease of Storage				
H. Size and Maneuverability				
I. Illustrations (kind and quality)				
J. Print Size				
K. Attractiveness				
L. Distractive Features				
II. Content and Subject Matter				
A. Vocabulary Level and Control				
B. Literary Style				
C. Content Span				
D. Visual Format				
E. Suitability for Group Use				
F. Suitability for Individual Use				
G. Continuity				
H. Reinforcement Value of Materials				
I. Potential for Creative Use				
J. Imbedded Evaluation of Student Progress				

	Excell (4)	Good (3)	Fair (2)	Poor (1)	
III. SOCIAL IMPLICATIONS					
A. Reference to Variety of Ethnic Groups					
B. Appeal to Varied Socioeconomic Levels					
C. Limitations for Use with Specific Groups					
IV. LEARNER RESPONSE VALUE					
A. Range of Sensory Inputs Required					
B. Pupil Response Mechanisms					
C. Interest Level					
D. Motivational Value					
E. Sex Orientation					
F. Use with Nonverbal Students					
V. TEACHER MANUAL					
A. Statement of Purpose for Materials					
B. Simplicity of Use (Manual)					
C. Specificity of Instruction					
D. Completeness of Instructions					
E. Suggested Supplementary Activities					
F. Reproduction of Student's Edition					

The following form is a XEROX of a needle sort card, used for evaluating instructional kits. This is a comparatively simple and efficient method of data gathering and storage. The format could also be used for other than kit evaluation by purchasing blank needle sort forms.

Evaluator: _____

Date _____, 19 _____ Title: _____

EVALUATION OF INSTRUCTIONAL MATERIALS

I. TITLE: _____ Copyright Date: 19 _____

Author(s) _____ Library No.: _____

II. PUBLISHER: _____

Address: _____

Local Distributor(s): _____

Address: _____

Net Cost: $___.___, Lease: $___.___ --Day, Week, Month, Year

Rental Fee: $___.___ --Hour, Day, Week, Month, Year, Other _____

III. DESCRIPTION OF THE POPULATION DESIGNED FOR:

Normal: _____, Other: (Specify) _____

Grade: Pre-School, K, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, College

M.A. Range: 3-5, 6-8, 9-11, 12-14, 15-17 years. Other _____

C.A. Range: 3-5, 6-8, 9-11, 12-14, 15-17 years. Other _____

IV. CURRICULAR AREA OF EMPHASIS:

___ Writing
___ English and Spelling
___ Speech, Language and Hearing Aids
___ Phonics
___ Reading
___ Social Studies
___ Arithmetic
___ Science
___ Health and Safety
___ Art and Music
___ Perceptual Motor
___ Vocational

Other (Specify): _____

V. RESEARCH & TESTING: Year: 19 ___, Location: _____

Types of children: _____ Age range: _____ IQ range: ___

Statistical treatment: _____ Results: _____

Field tested in '9 ___, Location: _____

Other types of testing: (Specify) _____

VI. MANUAL OR TEACHER'S GUIDE: None available ____, Purchase Separately ___

___ Daily lesson plans provided.
___ Description of theoretical basis included.
___ Instructions for usage of the materials.
___ Lists of correlated materials given.
___ Suggests follow-up materials.
___ A statement of the purpose of the materials and program stated.
___ Specifies supplemental materials needed.

VII. INSTRUCTIONAL OBJECTIVES: Manner in which they are covered:

___ Specifies entry behaviors or basic skills needed to begin.
___ Specifies terminal behaviors.
___ Specifies behaviors emphasized or introduced in each lesson.
___ Suggest how to maintain behaviors.

VIII. PHYSICAL CHARACTERISTICS OF THE PROGRAM: (specify number of each)

___ Audio tapes: cassettes, reel, loop
___ Records: 78___ 45___ 33-1/3___
___ Workbooks
___ Flashcards
___ Items in color, ___ Black & white items
___ Film loops
___ 2x2 slides
___ Film strips
___ Transparencies

Specify other materials included: _____

_____

IX. SPECIAL EQUIPMENT: None required ___

Tape recorders: cassette, reel, cartridge- 2 4 8 track
Record player: monaural, stereo. Head phones: monaural, stereo
Teaching machines: (specify type) _____
Projectors:

___ 2x2 slide
___ Film strip
___ Over-head
___ Opaque
___ Sound on Slide
___ 10mm movie
___ 8mm movie
___ Super 8 movie
___ 8mm loop
___ Super 8 loop
___ Controlled reader
___ Tachistoscope
___ Hoffman reader
___ TV receiver
___ Sound filmstrip

X. DESCRIPTION OF ILLUSTRATIONS: (specify number of each)

___ Cartoons -- color___ black & white ___
___ Abstract drawing -- color ___ black & white ___
___ Realistic drawings -- color ___ black & white ___
___ Photographs -- color ___ black & white ___

XI. DESCRIPTION OF CHARACTERISTICS OF THE MATERIALS:

YES	NO	
___	___	Reusable
___	___	Expendable items may be re-ordered
___	___	Items may be purchased individually as well as in quantity
___	___	*Self-evaluation for the pupil is provided
___	___	*Provides for teacher evaluation (specify type) _____
___	___	*The vocabulary and M.A. are on an equal level. (specify level) _____
___	___	*High interest low vocabulary (Specify interest _____ vocabulary _____)
___	___	*Sequenced
___	___	*Programmed

XII. SPECIAL FEATURES

___ Includes a placement test

___ Correlates with a standardized test. (Specify) _____

XIII. WHAT OTHER MATERIALS ARE RECOMMENDED BY THE AUTHOR OR PUBLISHER FOR USE WITH THIS? (Be specific)

PLEASE ADD ALL ADDITIONAL COMMENTS ON AN ATTACHED SHEET.

Library Card No.
___-___-___-___

Date: _____,19 ___

Evaluator: _____
Present Position (Circle one)
Parent - Student - Teacher -
Supervisor - Administrator -
Professor - Speech Therapist -
Other: _____

EVALUATION SHEET FOR INSTRUCTIONAL MATERIALS

I. TITLE: _____ Library No.: ___-___-_____
Author(s): _____
Publisher: _____

II. TYPE OF CHILDREN YOU USED THIS MATERIAL WITH:
Normal - EMR - TMR - ED (Emotionally Disturbed) - LD (Learning Disabilities) - Orthopedically Handicapped - Blind - Deaf - Gifted - Other: _____
M.A. Range: 3-5, 6-8, 9-11, 12-14, 15-17 years, other _____
C.A. Range: 3-5, 6-8, 9-11, 12-14, 15-17 years, other _____
Grade: Pre-school, K, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, College
Level: (Specify) _____

III. TYPE OF CLASSROOM YOU USED THIS MATERIAL IN: (Not applicable ___)
Normal elementary, normal secondary, EMR, TMR, ED, LD, Orthopedically handicapped, blind, deaf, gifted, speech therapy, college, other _____

IV. RATINGS: As based on the findings from your experience with the material.
___ A must regardless of budget.
___ Excellent--include even with a limited budget.
___ Good to include, but carefully consider if budget is moderate.
___ Useful as supplementary material.
___ Carefully consider before purchasing.

V. SPECIAL FEATURES

Yes	No	
___	___	Illustrations were large enough to be used with groups of children
___	___	The material can be easily used with my children.
___	___	The printed material was placed in such a way as not to be over stimulating or confusing to children with visual perception problems.
___	___	Ample space or material is provided of needed practice.
___	___	Most of the materials can be easily adapted for special use.

Stimulus value: ___ Is each new concept presented reinforced?
___ Concrete ___ Novel ___ Attractive
___ Holds attention ___ Provides obvious rewards to the child
___ Relevant stimuli is distinctive and readily noticed by the child
___ Built for transfer to real life? Describe in what way:

Quality and durability of materials in relation to cost:
___ Excellent ___ Good ___ Average or fair ___ Poor

Comments

Was the program too fast - slow for your children? Check one:
___ yes ___ no

Are the behaviors or tasks being taught pertinent to the final goals of the program? Check one: ___ yes ___ no

VI. What makes this material unique or different from others covering the same content at the same level of difficulty?

VII. SUPPORTATIVE MATERIALS
With what other commercially prepared materials do you foresee this being coordinated?

In your opinion:
Is it flexible for use with various teaching styles? ___ Yes ___ No
Is it flexible for use with other programs of instruction? ___ Yes ___ No

VIII. SUGGESTIONS FOR OPTIMUM RESULTS:

IX. POSSIBLE LIMITATIONS: (Be specific)

Describe how you modified this material or might modify it to overcome these limitations:

X. If you could, how would you change this material?

XI. REACTIONS AND COMMENTS:
As you see it, the most successful role of this material was:
(rank order each with one being low)

___ entertain ___ instruct other _____
___ inform ___ persuade _____

XII. A SURVEY
___ I have, or will soon, purchase this material.

CHECKLIST FOR EVALUATION OF PRINTED INSTRUCTIONAL MATERIAL

1. Trade name of item: _____

2. Publisher or producer's name and address: _____

_____

3. Copyright or production date, if given: _____

4. Cost of the item: $ _____

5. Does its teaching value or effectiveness justify its cost?

___ yes ___ no

6. Developmental information: (not available)

a. Author: _____ ___

b. Why developed: _____ ___

_____

_____

7. Contents:

a. Subject matter area (s): _____

b. Factually accurate? Yes ___ No ___

c. Is material geared to the chronological age and social interests of the student? Yes ___ No ___

8. Description of materials: _____

_____

_____

_____

_____

_____

_____

9. What was your objective in choosing this item? _____

_____

_____

_____

10. Was your objective met? Yes ___ No ___

11. How did you use this item? _____

_____

_____

_____

12. Is this the use the manufacturer recommended? Yes ___ No ___

13. Physical Characteristics:

a. Is the item an appropriate size? Yes ___ No ___

(Example: Can it be handled easily? Is the length overwhelming to a child?)

b. Is it durable? Yes ___ No ___

(Example: Is the binding sturdy? Does it soil easily?)

14. Describe teaching procedure. For example, is it used in a group or individually? Is it diagnostic? Can it be used without supervision?

_____

_____

_____

_____

15. Teacher Preparation:

a. Is a teacher manual available? Yes ___ No ___

b. If available, does it provide the teacher with adequate information to effectively use the item? Yes ___ No ___

c. Would some special teacher training be advisable to effectively use the item?

very necessary ___ helpful ___ unnecessary ___

d. Are pupil progress reports provided? Yes ___ No ___

16. Pupil Reaction:

a. Did pupils enjoy using it? Yes ___ No ___

b. Did it consistently hold their interest level over a period of time? Yes ___ No ___

c. Did their responses to the item meet with your expectations? Yes ___ No ___

17. The IMC considers your comments the most important part of an evaluation. The completion of the checklist provides only a preliminary screening. Please comment specifically on this material and send your evaluation to the Instructional Materials Center.

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

SELECT-ED Incorporated

MATERIALS SELECTION GUIDE

1. YOUR PURPOSE: What do you want material to do?

2a. MATERIAL PURPOSE: What does material say will do?

2b. Author procedure for meeting purpose.

Agreement between your stated purpose and material purpose.

☐ Extremely high ☐ High ☐ Satisfactory ☐ Low ☐ Extremely low

3. Note Unusual and limiting environmental conditions:

☐ Lack of materials
☐ Limited room space
☐ Limited desk space
☐ Other_____

4. Learner abilities, disabilities and level of functioning.

STUDENT CHARACTERISTICS	MATERIAL CHARACTERISTICS
Chronological Age	Chronological Age
Grade Level	Grade level
Mental Age	Mental Age
Reading Level	Reading Level
Specific "Label" for Student Problem	Specific "Label" for Student Problem
Physical Limitations ☐ Major factor ☐ Minor factor ☐ Not important	Physical Limitations ☐ Major factor ☐ Minor factor ☐ Not important
Sensory Handicap ☐ Major factor ☐ Minor factor ☐ Not important	Primary senses used by material to transfer information.

5. Organization
☐ Lessons
☐ Units
☐ Chapters
Other_____

6. Presentation (stimulus characteristic
☐ Auditory presentation
☐ Audio-visual
☐ Visual
☐ Tactile-kinesthetic
☐ Olfactory

7. Learner Interaction

☐ Motor ☐ Physical Activity (danse, jump, etc) ☐ Manipulation (beads, puzzles, etc) ☐ Write a response ☐ Mark a response	☐ Verbal ☐ Answers&Questions ☐ Repeats information ☐ Spontaneous contribution ☐ Visual Motor ☐ Copying tasks	☐ Visual ☐ Read ☐ Observe ☐ Matching ☐ Other_____ ☐ Verbal-motor

8. Learner [illegible]
How does [illegible] know response is correct?
☐ Teacher [illegible] student work ☐ Self-checking by student when work is complete ☐ Immediate feedback process of some kind

9. Evaluation Procedures
(a) How does student demonstrate mastery of content
☐ Written test ☐ Performance test ☐ Not stated ☐ Check list ☐ Oral test ☐ Other_____
(b) Is criteria for acceptable performance stated?
☐ Yes, explain _____ ☐ No

10. Teacher involvement Required: Teacher preparation (check one)
☐ Extensive ☐ Minimal ☐ Reasonable ☐ Virtually none or none at all

. Teacher involvement during time material is in use:
☐ Constant interaction ☐ Teacher introduces & student completes ☐ Supportive help or monitor role ☐ Virtually none or none at all

Teacher responsibility when student is through with material:
☐ Teacher must check & provide feedback ☐ Virtually none or none at all

11. Teacher Aids: Is there a teacher's guide or manual? ☐ Yes ☐ No
If yes, what does it include?
☐ Script ☐ Annotated copy of student manual ☐ Background information ☐ Extended activities ☐ Follow-up activities ☐ Other

12. Potpurri

General Design (description)	Illustration (describe)	Print type and size

13. Efficiency Quotient

Cost vs. skills concepts presented	How many students can participate at once?	Required teacher involvement?	How much time is required by the student?

☐ Consumable ☐ Reusable

14. Research Required ☐ Yes ☐ No

_____

_____

_____

_____

EVALUATION OF AN INSTRUCTIONAL MATERIAL

IDENTIFYING INFORMATION

1. TRADE NAME
2. PUBLISHER OR MANUFACTURER
3. AUTHOR

INFORMATION PROVIDED BY PUBLISHER

1. IS A TEACHER'S MANUAL OR INSTRUCTION BOOKLET PROVIDED? Yes ___ No ___
2. IF 1. ABOVE IS YES, WHAT CHANGES WOULD YOU RECOMMEND FOR IMPROVING THE MANUAL OR BOOKLET?

   a. _____

   b. _____

   c. _____
3. WOULD SOME SPECIAL TEACHER TRAINING BE ADVISABLE IN ORDER TO MAKE EFFECTIVE USE OF THE EQUIPMENT OR MATERIAL? Yes ___ No ___

ACTUAL USE OF MATERIALS

1. AGES OF STUDENTS YOU USED MATERIALS WITH _____
2. NUMBER OF STUDENTS WHO USED MATERIALS _____
3. TYPES OF HANDICAPPED CONDITIONS:

   ___ EMR ___ NH ___ LEARNING AND BEHAVIOR PROBLEMS ___ BLIND
   ___ VISUALLY HANDICAPPED ___ ORTHOPEDICALLY HANDICAPPED
4. INDICATE YOUR TEACHING OBJECTIVES WHEN YOU USED THIS MATERIAL.

   a. _____

   b. _____

   c. _____
5. HOW ELSE COULD THE EQUIPMENT OR MATERIAL BE USED OTHER THAN THOSE PROCEDURES SUGGESTED IN THE MANUAL?

   a. _____

   b. _____

   c. _____
6. WAS THE EQUIPMENT OR MATERIAL STIMULATING TO STUDENTS?

   Yes ___ No ___

7. IF 6. ABOVE IS NO, WHAT CHANGES COULD BE MADE IN THE MATERIAL TO MAKE IT MORE STIMULATING?

   a. _____

   b. _____

   c. _____

8. WAS THE EQUIPMENT OR MATERIAL THOROUGHLY ADEQUATE FOR USE WITH YOUR OBJECTIVE?

   _____

   WAS THE EQUIPMENT OR MATERIAL LIMITED IN ITS POTENTIAL? _____

   HOW WAS THE EQUIPMENT OR MATERIAL LIMITED? _____

PHYSICAL CHARACTERISTICS

1. IS THE EQUIPMENT OR MATERIAL DURABLE Yes ___ No ___
2. CAN THE EQUIPMENT OR MATERIAL BE RESUED Yes ___ No ___
3. IS THE EQUIPMENT OR MATERIAL PORTABLE? Yes ___ No ___
4. IS THE EQUIPMENT OR MATERIAL PACKAGED

   a. FOR EASY USE Yes ___ No ___

   b. FOR EASY STORAGE Yes ___ No ___

5. IF 4.a. IS NO, WHAT CHANGES WOULD YOU RECOMMEND?

   a. _____

   b. _____

6. IF 4.b. IS NO, WHAT CHANGES WOULD YOU RECOMMEND?

   a. _____

   b. _____

   c. _____

COMMENTS:

EVALUATION OF AN INSTRUCTIONAL MATERIAL

1. Trade name of item:

2. Publisher or producer's name and address:

3. Copyright or production date, if given:

4. Developmental information: Not Available

   4a. Author _____ _____

   4b. Where developed _____ _____

   4c. Why developed _____ _____

   _____

5. Evaluation setting:

6. Contents:

   6a. Subject matter area(s): _____

   6b. Factually accurate? Yes ___ No ___

7. Description of the item:

8. Describe how you used the item:

   Is this the use the manufacturer recommends? Yes ___ No ___

9. Cost: $ _____

   9a. Does its teaching value or effectiveness justify its cost?

   Yes ___ No ___

10. Physical characteristics:

10a. Is it adequately durable? Yes ___ No ___

10b. Can it be reused? Yes ___ No ___

10c. Are replacement parts available? Yes ___ No ___

Information not available ___

10d. Is it portable? Yes ___ No ___

10e. Is it easy to use? Yes ___ No ___

11. Teaching procedure:

12. Teacher preparation:

12a. Is a teacher manual available? Yes ___ No ___

12b. If available, is it adequate? Yes ___ No ___

12c. Would some special teacher training be advisable in order to make effective use of it?

Very necessary ___ Helpful ___ Unnecessary ___

12d. Are pupil progress reports provided? Yes ___ No ___

13. Pupil reaction:

13a. Attractive? Yes ___ No ___

13b. Does it consistently hold the interest level over a period of time? Yes ___ No ___

14. Comments:

FORM A

MATERIAL EVALUATION FORM

TEACHER _____ SCHOOL DISTRICT _____

PRODUCT NAME _____

I. Instructional Objective
What did you hope to accomplish in using this material? _____

_____

II. Description of Material

Textbook ___ Workbook ___ Record ___ Filmstrip ___ Transparency ___
Test ___
Equipment (specify) _____

Can be used with: Individual ___ Group ___ Both ___
Can student use alone? Yes ___ No ___

III. Teacher Preparation

Teacher preparation needed: Great ___ Moderate ___ Little ___
Manual included? Yes ___ No ___
Is manual useful? Excellent ___ Good ___ Fair ___
Poor ___

IV. Physical Properties

Consumable: Yes ___ No ___
Durability: Excellent ___ Good ___ Fair ___ Poor ___
Attractive to students: Excellent ___ Good ___ Fair ___ Poor ___

V. Evaluator Setting

Level: Pre-prim ___ Prim ___ Int ___ Jr. H ___ Sr. H ___
Area of Exceptionality:
TMR ___ EMR ___ LD ___ ED ___ Hearing Impaired ___
Blind ___ Other _____

Class size _____
Geographic locality: Rural ___ Urban ___ InnerCity ___ Suburban ___

Are correlated audio-visual available? Yes ___ No ___

SEIMC/RMC NETWORK
PROCEDURES MANUAL FOR THE
DEVELOPMENT OF STATE AND LOCAL SEIMC's

Number:
Date Effective:

SECTION: Evaluation

Replaces:

SUBJECT: Materials Evaluation (Form A)

TASK: To determine user reactions to a given instructional material.

PURPOSE: To gather data about a given material which will suggest its potential value as an aid to teaching.

DEFINITIONS:

GENERAL:

STEPS	COMMENTS
1. To be filled out by the user (teacher-evaluator) subsequent to his having used and/or carefully reviewed the material.	
2. Tabulate data.	
3. Indicate potential value as suggested by the data.	

RELATED DOCUMENTS:

EME 1-10

MATERIALS

EVALUATION FORM[1]

Material's Name_____ Cost_____ Rater_____ Date_____

Type of Material_____
(sound tape, paper product, video, etc.)

Evaluation Criteria

1. Success with target population				
.1 effectiveness in producing specified skills				
.1 criterion referenced				
.1 immediately after instruction	(<70% met criterion) 0	(70-89% met criterion) 1	(90-100% met criterion) 2	
.2 retention	0	1	2	
.2 other	(Average score is < 75%) 0	(Average score is > 75%) 1		
.1 immediately after instruction				
.2 retention	0	1		
.2 time needed to complete a given unit	(not commensurate w/skill attained) 0	(appears appropriate) 1		
.3 frequency of use by teachers or students on a "free market"*	(Used by <30% of approp. population) 0	(30% - 70%) 1	(>70%) 2	
.4 used (teacher and learner) rating of materials	(poor) 0	(fair) 1	(good) 2	(excellent) 3

*"free Market" - readily available to teachers in a school depository such as the school's media center or library.

Evaluation Criteria

2. Physical characteristics of the materials				
.1) Durable	(Easily destroyed) 0	(durable) 1	(will take a tremendous beating) 2	
.2) Safe (non-flammable, non-toxic, no sharp edges, etc.)	(unsafe) 0	(probably safe) 1	(definitely safe) 2	
.3) Easy to handle and use	(cumbersome, easily lost, misplaced, etc.) 0	(good) 1		
.4) Visual quality	(complicated or illogical) 0	(probably good) 1	(outstanding) 2	
.1) Pictures and graphic displays illustrate well the appropriate objectives and subobjectives	(not good) 0	(helpful) 1	(outstanding) 2	
.2) Pictures and graphic displays are of good quality	(poor) 0	(good) 1		
.5) Will materials become outdated in three - five years?	(yes) 0	(no) 1		
.6) Are objectives specified in performance terms?	(no) 0	(yes) 1		
.7) Do materials indicate skills to be learned?	(no) 0	(yes) 1		
.8) Ease of partial usage	(cannot easily switch from specified materials to others and back) 0	(portions (modules) of the material may be easily used without using the whole set) 1		
.9) Material is complete within itself	(gaps in content are noticeable) 0	(comprehensive) 1		
.10) Degree of used training required to use the materials effectively	(>8 hours) 0	(4-8 hours) 1	(2-4 hours) 2	(2 hours or less) 3

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Evaluation Criteria - page 2

2. Physical Characteristics of the Materials				
.11) Amount of planning and materials preparation to implement an average hour of instruction	(none) 0	(little - 10 min. or less) 1	(moderate amount 11-60 min.) 2	(large amount 60 min.)
.12) Materials contain a guide which				
.1) specifies the learning goals	0		(goals specified) 1	
.2) specifies the performance objectives	0		(performance objectives specified) 1	
.3) makes explicit the kinds of learning tasks that are envisioned in pursuing the performance objectives	0		(explicit presentation strategies) 1	
.4) provides a rationale to tie each objective to the overall, long-term learning skills development	0		(rationale provided) 1	

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3.)			
.1) Provision for differential entry levels	(single entry point) 0		(multiple entry levels) 1
.2) Provision for different routes and rates in achieving the objectives	(single route and rate) 0		(multiple routes and rates) 1
.3) Learner can use material independently	(completely teacher directed) 0	(some teacher direction required) 1	(little or no teacher direction required) 2
.4) Materials provide the opportunity for periodic student progress assessment	(end of unit feedback only) 0	(periodic feedback) 1	(continuous feedback) 2
.5) To what degree do the lessons make specific provision for active student response?	(no provision for student response) 0	(moderate provision for student response) 1	(every child given opportunity to respond independently to every teacher-planned response situation) 2
.6) Do the materials specify alternatives should the student not reach the planned objective?	(no provision to remediate deficiency) 0		(provision to remediate deficiency) 1

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4.) Motivation Characteristics of the Materials		
.1) Use of game format	0	(game format) 1
.2) Use of humor	0	(uses humor satisfactorily) 1
.3) Use of variety of stimuli	0	(varies stimuli to eliminate or retard fatigue) 1
.4) Use of suspense	0	(suspense used effectively) 1
.5) Use of novelty	0	(novelty used effectively) 1
.6) Use of interactive system with instantaneous feedback	0	(uses continuous feedback) 1

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5.) TESTS					
.1) face validity of items	(not apparent) 0	(could be better) 1	(very apparent) 2		
.2) reliability (test-retest) of items	< 70% 0	> 70% 1			
.3) examinee appropriateness .1) comprehension level: content	(inappropriate) 0	(doubtful) 1	(possibly approp.) 2	(probably approp.) 3	(exactly right) 4
instructions	0	1	2	3	4
.2) format .1) visual principles	(complicated) 0	(probably good) 1	(outstanding aids) 2		
.2) quality of instructions	(not good) 0	(helpful) 1	(excellent) 2		
.3) time and pacing	(bad) 0	(appropriate for broad range) 1			
.3) recording answers	(complicated) 0	(standard) 1	(especially easy) 2		
.4) administrative usability .1) administration .1) test administration	(individual) 0	(small groups) 1	(large groups) 2		
.2) training of administrators	(psychometrist) 0	(school staff) 1			
.3) administration	(43+ minutes) 0	(42 minutes or less) 1			
.2) scoring	(subjective) 0	(difficult) 1	(simple) 2		
.3) interpretation .1) score interpretation	(uncommon, abtruse) 0	(common, simple) 1			
.2) score conversion	(complicated) 0	(simple) 1	(clear, tables) 2		
.4) score interpreter	(psychometrist) 0	(school staff) 1			
.5) can decisions be made on basis of?	(doubtful) 0	(possible) 1	(probable) 2	(yes - charts & graphs) 3	

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INSTRUCTIONAL MATERIALS EVALUATION FORM

Title _____

_____

Terminal objectives _____

_____

DIRECTIONS: PART I is for materials evaluation. In the light of your TERMINAL OBJECTIVES you should fill in the box case in each item which indicate whether you AGREE (+) or DISAGREE (-) or that the item is NOT APPLICABLE (NA). For example, if the re..ing level fits your needs you will fill in the box next to READING LEVEL in the first column under (+). If the material is not MULTISENSORY IN APPROACH, you should darke. the box under (NA) next to that item. PARTS II-VI are for demographic data describing the context of use of the materials. (descriptors). Please use any comments relevant to your objectives on the back of this form.

		+	-	NA	
I.	1.	☐	☐	☐	Fits existing terminal objectives
	2.	☐	☐	☐	Can be extended to other phases of curnculum
	3.	☐	☐	☐	Helps accomplish objectives of curnculum
	4.	☐	☐	☐	Organized for sequential development of concepts/skills
	5.	☐	☐	☐	Enables student to practice and maintain concepts/skills
	6.	☐	☐	☐	Provision made to evaluate progress
	7.	☐	☐	☐	Enables student exploration, problem solving, discovery
	8.	☐	☐	☐	Allows flexibility, provides for individual differences
	9.	☐	☐	☐	Motivating to student
	10.	☐	☐	☐	Multi-sensory in approach
	11.	☐	☐	☐	Content
	12.	☐	☐	☐	Interest level
	13.	☐	☐	☐	Reading level
	14.	☐	☐	☐	Vocabulary
	15.	☐	☐	☐	Graphic illustrations
	16.	☐	☐	☐	Instructions for student clear, concise, easily understood
	17.	☐	☐	☐	Instructions for teacher easily followed, appropriate
	18.	☐	☐	☐	Allows independent use by student
	19.	☐	☐	☐	Format
	20.	☐	☐	☐	Type size, material used in construction
	21.	☐	☐	☐	Size, number of parts, storage factor, portability
	22.	☐	☐	☐	Durability
	23.	☐	☐	☐	Requires in-service training for users
	24.	☐	☐	☐	Teaching value justifies its cost
	25.	☐	☐	☐	Requires adaptation for present purposes
	26.	☐	☐	☐	Can be used with bilingual children

II. Number of pupils for whom material requested: ☐ 1 ☐ 2-5 ☐ 6+

III. Capacity in which you serve exceptional children:

- ☐ Special class teacher
- ☐ Regular class teacher
- ☐ Resource teacher
- ☐ Speech therapist
- ☐ Educational diagnostician
- ☐ Hearing therapist
- ☐ Bilingual educator
- ☐ Student
- ☐ Other (specify) _____

IV. With what type of child will material be used:

- ☐ EMR
- ☐ TMR
- ☐ L/LD
- ☐ PMR
- ☐ Blind
- ☐ Deaf
- ☐ Physically handicapped
- ☐ Multiply handicapped
- ☐ Special health problems
- ☐ Speech impaired
- ☐ Emotionally disturbed
- ☐ Minimally brain-injured
- ☐ Partially sighted
- ☐ Hard-of-hearing
- ☐ Regular class
- ☐ Other _____

V. Educational level of material desired:

- ☐ Pre-school
- ☐ 6-7 years
- ☐ 8-9 years
- ☐ 10-11 years
- ☐ 12-13 years
- ☐ 14-15 years
- ☐ 16-17 years
- ☐ 18-up

VI. Current location of instructional program:

- ☐ Regular class
- ☐ Special class
- ☐ Resource room
- ☐ Homebound
- ☐ Other _____

PLEASE USE THE REVERSE SIDE FOR CRITICAL COMMENTS

TEACHER: COMPLETE, AND RETURN TO SEIMC WITH THE MATERIALS

1. Number of pupils with whom materials were used _____

2. You are a
   - _____ Regular class teacher
   - _____ Special class teacher
   - _____ Other (please specify) _____

3. With what type of children did you use these materials?
   - _____ EMR
   - _____ Physically handicapped
   - _____ Speech impaired
   - _____ Multiply handicapped
   - _____ Partially sighted or blind
   - _____ Hard of hearing or deaf
   - _____ Other (please specify) _____

4. School placement of children using the materials
   - _____ Preschool
   - _____ Primary
   - _____ Intermediate
   - _____ Junior high
   - _____ Senior high

5. Location of your class
   - _____ Public day school
   - _____ Other (please specify) _____

6. Instructional purpose
   - _____ Reading
   - _____ Arithmetic (Math)
   - _____ Social Studies
   - _____ Sciences
   - _____ Language Arts
   - _____ P.E.
   - _____ Music and Art
   - _____ Other (please specify) _____

FOR OFFICE USE ONLY

Center _____

Name of Material (if necessary specify series and/or level) _____

Date sent _____ Date returned _____ Condition upon return: Poor Fair Good Excellent

Check the items below which best describe the value of this material for your instructional purposes.

26. _____ Durable	31. _____ Practical	36. _____ Reuseable	41. _____ Instructional	46. _____ For small group use
27. _____ Mediocre	32. _____ Inflexible	37. _____ Challenging	42. _____ Inappropriate	47. _____ For individual use
28. _____ Exciting	33. _____ Entertaining	38. _____ Boring	43. _____ Effective	48. _____ Easy to manage
29. _____ Disorganized	34. _____ Not revelant	39. _____ Informative	44. _____ Unenjoyable	49. _____ Suitable length
30. _____ Attractive	35. _____ Unclear	40. _____ Inadequate	45. _____ Inaccurate	50. _____ Interesting to students

Other (please specify _____

51. Would you use this material again? Yes_____ No_____

52. Is this material readily available to you through any source other than the SEIMC? Yes_____ No_____

Comments and/or explanations (if you wish) _____

PARTICIPANTS REACTIONS TO THE CONTINUATION OF IN-SERVICE

1. Would you be interested in continuing to receive IN-SERVICE or a similar service on a paid-subscription basis?

YES ___ NO ___

Comments:

2. Which, if any, of the following groups do you think would subscribe to IN-SERVICE or a similar service if it were offered on a paid-subscription basis?

____ Associate center directors
____ Staff of other R, D & D projects
____ Local special education directors
____ Special education teachers
____ Regular teachers
____ Local school administrators
____ Legislators
____ Parents
____ Researchers
____ University faculty
____ _____
(other--specify)

Comments:

3. If the CEC Information Center were to offer a comprehensive weekly news service at an annual subscription rate of $15 per topic, to which of the following topics would you subscribe?

____ Current program descriptions
____ Current research
____ New instructional materials
____ Current legislation
____ Current funding
____ Teacher training programs and materials
____ New tests
____ Current bibliographies and reference works
____ New teaching techniques
____ Educational media and technology
____ Administrative techniques
____ IMC program descriptions
____ Evaluation techniques
____ Book reviews

____ Personnel changes and vitae
____ Current workshops and meetings
____ Dissemination programs and techniques
____ Equipment and facilities
____ Educational needs and objectives
____ Federal news
____ BEH news and programs
____ Other federal programs

____ _____
(other--specify)

____ _____
(other--specify)

Comments:

4. If the CEC Information Center were to offer an information service package including a weekly news service covering up to three (3) topics, any 10 current issues of the Exceptional Child Bibliography Series, and up to 5 individualized literature searches* for $100 per year, would you subscribe?

YES ___ NO ___

*As of January 1, 1974, all CEC Information Center services and products will be available only on a paid basis.

Comments: